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Nova Scotia

FORESTRY

Report of the Nova Scotia Royal Commission on Forestry

1984

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Nova Scotia

Royal Commission on Forestry

Dr John Connor
Chairman

Dr GA MacKinnon
Judge D Lewis Matheson, QC
Commissioners

1740 Granville Street
PO Box 698
Halifax, Nova Scotia
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November 22, 1984

The Honourable Alan R. Abraham
Lieutenant Governor of Nova Scotia

May it please your honour, Sir,

Pursuant to the powers contained in the Public Inquiries Act, Chapter 250, of the Revised Statutes of Nova Scotia 1967, as amended, and by Order in Council 82-571 dated May 6, 1982, and amended by Order in Council 82-1320 dated November 9, 1982, we the undersigned were appointed as Commissioners to inquire into and report upon the matters set out in the said Order in Council.

The duties assigned to us have been completed and our report is submitted herewith for your Honour's consideration.

We have the honour to be your obedient servants,

John Connor
Chairman

G. A. MacKinnon
Commissioner

D. Lewis Matheson
Commissioner

PROVINCE OF
NOVA SCOTIA

(LIEUTENANT GOVERNOR'S SEAL)
BY HIS HONOUR
THE HONOURABLE JOHN E. SHAFFNER
LIEUTENANT GOVERNOR OF NOVA SCOTIA

TO: HIS HONOUR CHIEF JUDGE NATHAN GREEN, OF HALIFAX, COUNTY OF HALIFAX:

REVEREND GREGORY MACKINNON, OF ANTIGONISH, COUNTY OF ANTIGONISH:

DR. JOHN CONNOR, OF WOLFVILLE, COUNTY OF KINGS:

GREETING:

WHEREAS it is deemed expedient to cause inquiry to be made into and concerning the public matters hereinafter mentioned in relation to which the Legislature of Nova Scotia may make laws;

AND WHEREAS the forest resources of Nova Scotia have sustained the economic and social well-being of the people of Nova Scotia since the establishment of the Province;

AND WHEREAS the industries and employment supported by forest resources of the Province are of great importance to the present and future economic development of Nova Scotia;

AND WHEREAS it is desirable to assess the present state of forest resources in the Province to determine measures which should be taken to enhance benefits which may be derived from the lands and forests of the Province in the future;

NOW KNOW YE THAT I have thought fit, by and with the advice of the Executive Council of Nova Scotia, to appoint, and do hereby appoint you, the said His Honour Chief Judge Nathan Green, Reverend Gregory MacKinnon, and Dr. John Connor, to be during pleasure Our Commissioners under the Public Inquiries Act, the first named to be Chairman thereof, to inquire into and make recommendations to the Governor in Council respecting all forest and related resources of Nova Scotia, their present and future importance to the economy and people of Nova Scotia, and the measures most appropriate to the preservation, protection, regeneration, enhancement, use of and production from forest lands and resources, including fish and wildlife, for the economic, social and other benefit of the people of Nova Scotia, and without limiting the generality of the foregoing, to consider, and make recommendations with respect to:

(a) The present and projected forest inventory, its quantity, quality, distribution, value, and availability, and the sustainable harvest levels for products of the forests in relation to present and future industrial and other demands;

(b) The most appropriate forest management procedures, including protection and the utilization of the forest resources of Nova Scotia, to ensure maximum future benefits;

(c) The impact of land ownership and tenure, competing uses and forest management practices on the future supply of forest products, fish and wildlife population, and recreational opportunities in Nova Scotia;

(d) The role of Governments, at all levels, in relation to all aspects of the use and management of the resources of the forests of Nova Scotia, including taxation, and the most appropriate regulatory framework for the Province.

1. Direct the said Commissioners to ensure that a broad public input is sought to obtain an assessment of the wishes of the people of the Province as to the management and use of Nova Scotia's forest resources, and to seek and receive briefs and submissions from various interested groups from both in and outside of the Province;

2. Direct the said Commissioners to consider and to make recommendations to the Executive Council respecting requirements of special industries and segments of the economy and those persons associated therewith whose activities are most closely related to the use of forest products in various regions of Nova Scotia;

3. Direct the said Commissioners to retain the services of such technical, clerical, and other personnel, including forestry experts and legal counsel who, in the opinion of the Commissioners, are required for the purpose of the inquiry;

4. Authorize the payment to the Commissioners, secretary, and other personnel required in the work of the Commissioners, for necessary disbursements, travel and reasonable living expenses as are required in the discharge of their duties;

5. Order that remuneration, costs, and expenses payable or incurred in the course of the inquiry shall be paid out of the Consolidated Fund of the Province;

6. Direct the Commissioners to report, as soon as possible, to the Executive Council the evidence taken before them, their findings and recommendations, as they see fit.

The power and authority of the said Commissioners shall extend to, and include, all matters which they consider relevant to the inquiry prior to, or subsequent to, the date of their appointment.

GIVEN under my Hand and Seal at Arms at the City of Halifax this 6th day of May in the year of Our Lord one thousand nine hundred and eighty-two and in the thirty-first year of Her Majesty's reign.

(SIGNED) HARRY HOW
PROVINCIAL SECRETARY

PROVINCE OF
NOVA SCOTIA

(LIEUTENANT GOVERNOR'S SEAL)

BY HIS HONOUR
THE HONOURABLE JOHN E. SHAFFNER
LIEUTENANT GOVERNOR OF NOVA SCOTIA

TO: DR. JOHN CONNOR, OF WOLFVILLE, COUNTY OF KINGS:

REVEREND GREGORY MACKINNON, OF ANTIGONISH, COUNTY OF ANTIGONISH:

HIS HONOUR JUDGE D. LEWIS MATHESON, OF SYDNEY, COUNTY OF CAPE BRETON:

GREETING:

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NOW KNOW YE THAT I have thought fit, by and with the advice of the Executive Council of Nova Scotia, to appoint, and do hereby appoint you, the said Dr. John Connor, Reverend Gregory MacKinnon, and His Honour

Judge D. Lewis Matheson, to be during pleasure Our Commissioners under the Public Inquiries Act, the first named to be Chairman thereof, to inquire into and make recommendations to the Governor in Council respecting all forest and related resources of Nova Scotia, their present and future importance to the economy and people of Nova Scotia, and the measures most appropriate to the preservation, protection, regeneration, enhancement, use of and production from forest lands and resources, including fish and wildlife, for the economic, social and other benefit of the people of Nova Scotia and, without limiting the generality of the foregoing, to consider and make recommendations with respect to:

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(c) The impact of land ownership and tenure, competing uses and forest management practices on the future supply of forest products, fish and wildlife population, and recreational opportunities in Nova Scotia;

(d) The role of Governments, at all levels, in relation to all aspects of the use and management of the resources of the forests of Nova Scotia, including taxation, and the most appropriate regulatory framework for the Province.

1. Direct the said Commissioners to ensure that a broad public input is sought to obtain an assessment of the wishes of the people of the Province and to the management and use of Nova Scotia's forest resources, and to seek and receive briefs and submissions from various interested groups from both in and outside of the Province;

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GIVEN under my Hand and Seal at Arms at the City of Halifax this 9th day of November in the year of Our Lord one thousand nine hundred and eighty-two and in the thirty-first year of Her Majesty's reign.

(SIGNED) HARRY HOW
PROVINCIAL SECRETARY

ACKNOWLEDGEMENTS

The Royal Commission on Forestry wishes to acknowledge the assistance, so graciously given, of many individuals and institutions. The Commission was encouraged by the large number of briefs, both oral and written, which were submitted by Nova Scotians and others. (See Appendices I and II.) Evidence of the problems facing forestry in Nova Scotia was graphically presented in the course of public hearings and on field trips throughout the province, as were possible solutions to these problems, and the unfailing courtesy of those who offered assistance made the Commission's task much easier.

The Commission received valuable advice and help from experts in many parts of Canada, especially from those of the Nova Scotia Department of Lands and Forests, the Canadian Forestry Service, the New Brunswick Department of Natural Resources, Mr. F.L.C. Reed, and Dr. G.L. Baskerville. The Commission also expresses deep gratitude to all who offered their services during field trips and consultations in West Germany, Sweden, Finland, the United Kingdom, Canada, especially Nova Scotia, and several parts of the United States. These field trips were of particular importance in broadening the Commission's understanding of forestry, and in providing examples for Nova Scotia.

The Commissioners were greatly assisted by the contributions of Mr. Alan Steel, co-ordinator, Mrs. Iris Paterson, secretary, and Dr. Timothy Brownlow, writer, who were responsible for arranging the Commission's work, and for the presentation of the final report.

Finally, the Commission wishes to record its debt to its first Chairman, the late Chief Judge Nathan Green. His wisdom and prudence set the Commission's course, and left an indelible mark upon its deliberations and conclusions. It is hoped that the final result would have merited his approbation.

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Foreword

In arriving at its conclusions, the Commission is most conscious of the wide diversity of interests concerning the forestry system in Nova Scotia. Where these interests were in conflict, it became necessary to consider the validity of the separate positions in relation to the goal of good forestry. These considerations involved the best scientific and practical knowledge available, and the Commission has no reservations about the sufficiency of this knowledge. What is presented, therefore, is solidly grounded in good science, and in the practical experience of prudent persons.

The Commission has been advised, and accepts, that an optimum forest programme ought to satisfy the following criteria:

(a) Technical: Is the policy founded on a sound technical base?

(b) Economic: Are benefit/cost ratios satisfactory, and can the funds be secured?

(c) Environmental: Are acceptable standards met with respect to ecology and human health?

(d) Operational: Can the recommendations be implemented in the field on an operationally feasible basis?

(e) Administrative: Are the suggested policies compatible with administrative constraints?

(f) Social: Will the changes meet with the approval of society, especially in the local communities impacted most directly?

The Commission has every confidence that these obligations can be met. In addition, there are considerations of a political nature which can bear significantly upon whether a development policy can be fulfilled. The Commission offers no comment in regard to this aspect, being firm in its conviction that the establishment and maintenance of a sound forestry system is a desirable and attainable goal for Nova Scotia.

Finally, it can not be over-stressed that the report which follows is a policy statement, and rarely deals with details or specifics of a technical nature. Such matters are the province of the professional. It must also be stressed that, with few exceptions, the report has internal interdependence, and should be considered in its entirety; no element should be considered in isolation. The Commission is convinced that the objective of establishing a flourishing forest will be achieved only if all elements of the report are respected.

Introduction

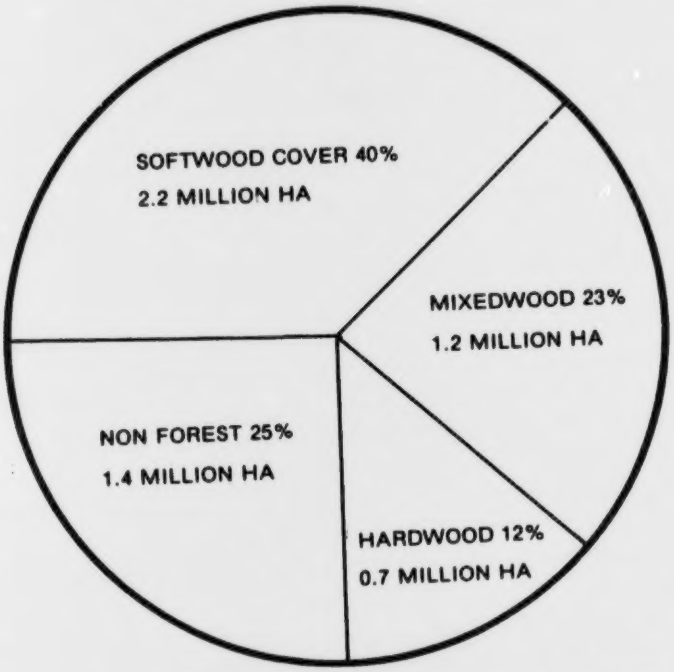
Forestry is Nova Scotia's largest resource-based industry, and seventy-five per cent of the land base of the province is covered by trees. The total annual output of the industry is valued at over $500 000 000, with an average annual requirement of 3 300 000 cubic metres (m^3) (1 500 000 cords) of softwood fibre and 413 000 m^3 (200 000 cords) of hardwood fibre. Forest industries are major sources of employment and incomes, employing about 8 000 people directly, and a further 16 000 indirectly.

The forest ought to be seen as part of a dynamic environment subject to biological, industrial, and social changes. Some of these changes occur consistently, others unpredictably. Words such as 'fragile', 'delicate', and sensitive' are used frequently when environmental matters are discussed, and one could add to this list the terms 'resilient', 'durable', and 'self-restoring', as evidenced by nature's annual recuperation after the ravages of winter. The impact of human activities on much of the forest is continuous, but, in all but the most extreme cases, nature restores itself and eradicates the traces of man's presence.

The forest is called upon to satisfy the needs of a wide diversity of people. Over 100 000 hunting licences are issued, so at least that many people seek satisfaction from the pursuit of game, and further recreational enjoyment is obtained from camping, picnicking, nature photography, or simply walking in the woods. Wildlife devotees rightly expect their interests to be considered. Industry perceives the forest as a continuing source of raw material, and both the basis of salaries paid to employees and of profits. Commercial interests play an essential and productive role.

The location of the province in the eastern maritime temperate climatic zone, with variable weather conditions and soils, favours the growth of softwood and hardwood forests. The principal species are spruce, fir, pine, hemlock, maple, birch, oak, and aspen. Softwoods grow on 2 200 000 hectares (ha) (5 500 000 acres), with a further 1 200 000 ha (3 000 000 acres) in mixedwood stands, leaving 700 000 ha (1 730 000 acres) in hardwood growth. Spruce species, principally red and black, predominate among the softwoods on the central and western mainland, while white spruce and balsam fir are the dominant softwoods on the eastern mainland and Cape Breton Island. Much of the softwood forest is now mature to overmature, and extremely susceptible to damage from insects and diseases. While the growth of mature softwood stands in the province is under 2.1 cubic metres per hectare per annum (2.1m³/(ha.a)) (0.38 cords per acre per year) (0.38 cords/acre/year), the land base on average is capable of growing 8.4 m³/(ha.a) (1.5 cords/acre/year).

FIGURE 1
AREA CLASSIFICATION IN PER CENT

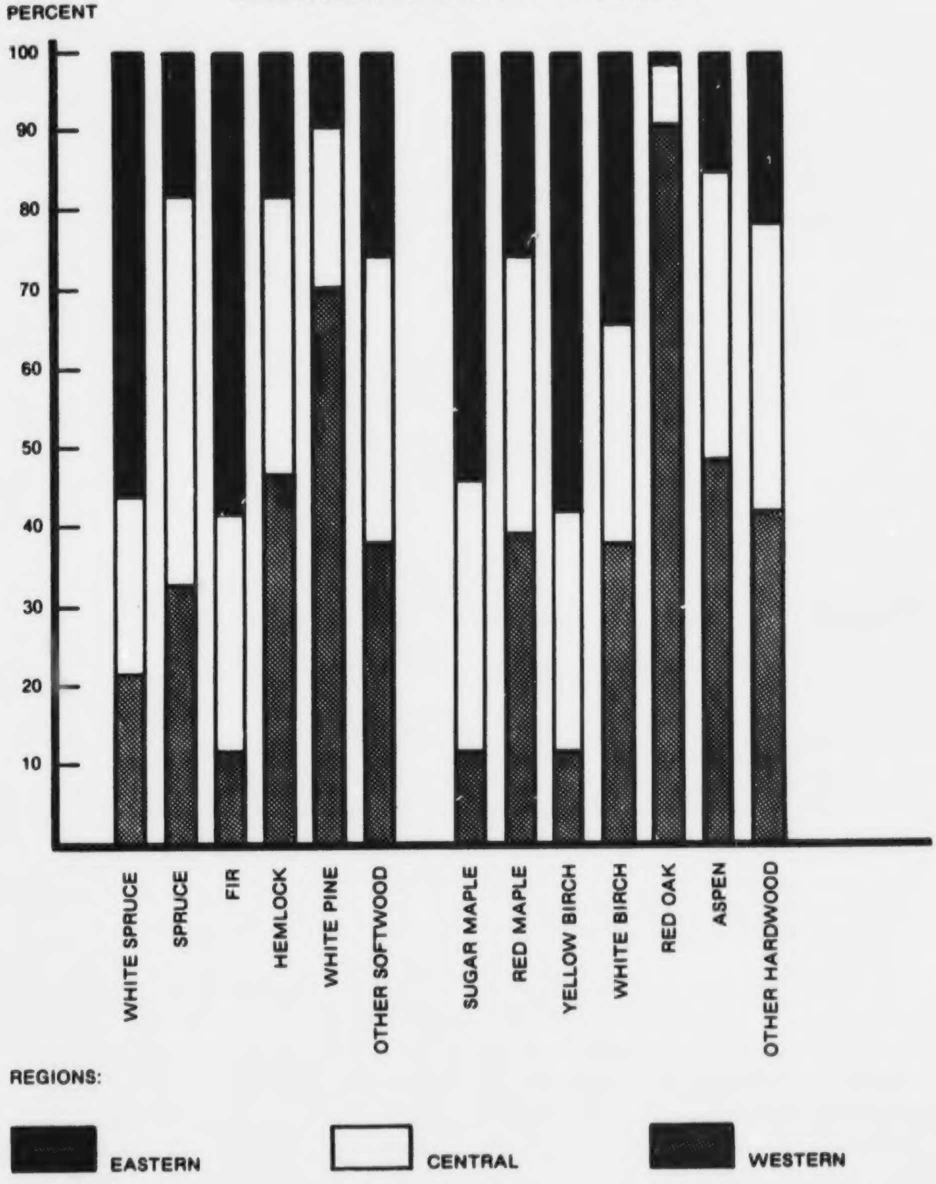


LAND AND WATER AREA 5.5 MILLION HECTARES
FOREST AREA 4.1 MILLION HECTARES

INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

Hardwoods are evenly distributed throughout the province, except for the Cape Breton Highlands, and make up a significant component of the forest, comprising about one third of the trees. Fifty-three per cent of the hardwood stock is maple, twenty-eight per cent birch, and eight per cent aspen, and oak, beech, and ash, among others, are found in smaller quantities. The current inventory estimates the total volume of hardwood to be 96 900 000 m³ (46 900 000 cords), but most of this, if not all, is of indifferent commercial quality in comparison with stock in Ontario, Quebec, and the United States. Current growth in mature hardwood stands has been calculated at about 1.5 m³/(ha.a) (0.28 cords/acre/year). The Department of Lands and Forests has divided the province into three regions for inventory purposes, as follows:

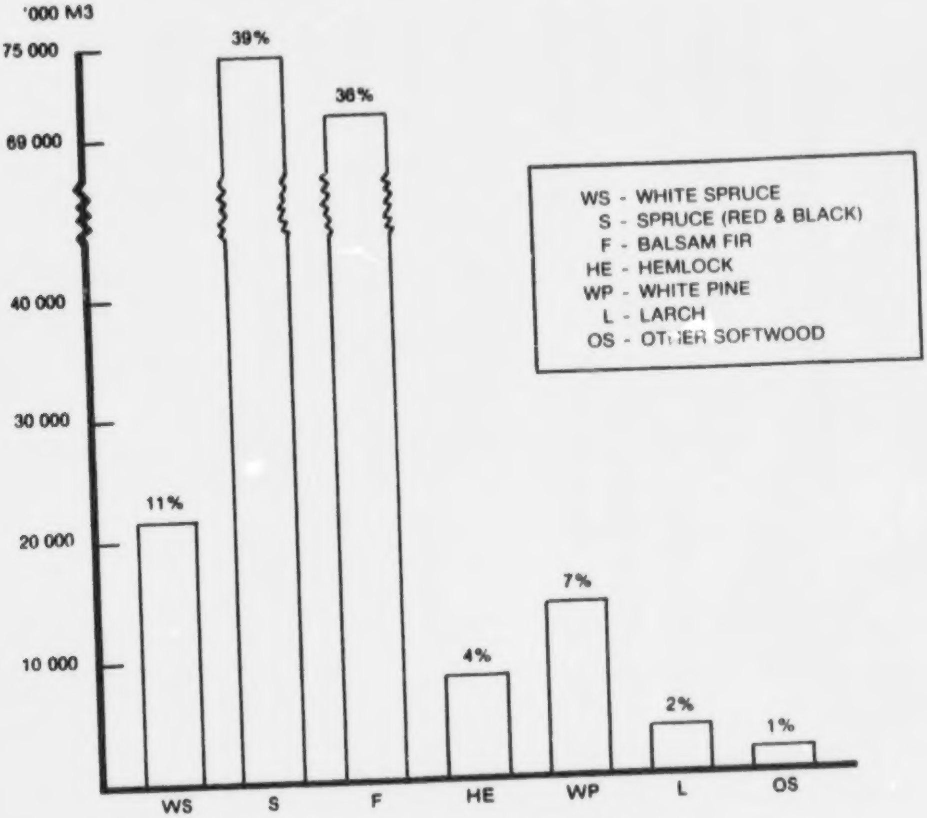
FIGURE 2
SPECIES DISTRIBUTION BY REGION



INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

western - Digby, Yarmouth, Shelburne, Queens, Lunenburg, Kings, and Annapolis Counties; central - Halifax, Hants, Cumberland, and Colchester Counties; and eastern - Pictou, Antigonish, and Guysborough Counties, and Cape Breton Island.

FIGURE 3
SOFTWOOD SPECIES BY PER CENT

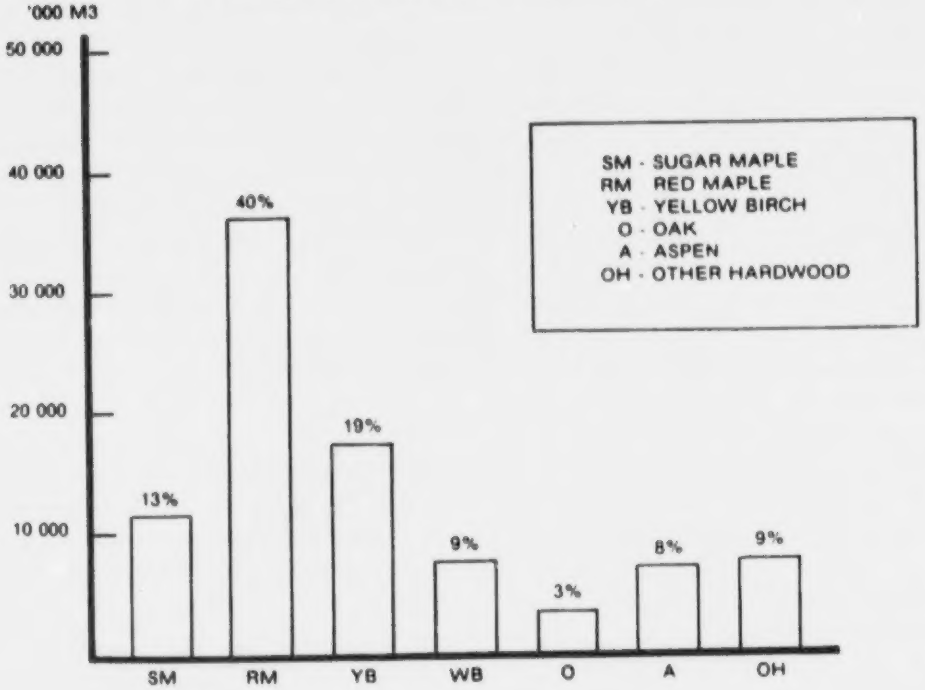


SOFTWOOD VOLUME = 193 000 000 m^3

INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

Nova Scotia has a gross surplus of hardwood, because only about one third of the annual allowable cut of 1 240 000 m^3 (600 000 cords) is used for industrial purposes. It is uncertain what use is made of the remainder, although some is consumed in the domestic fuelwood market. There is a limited opportunity for the disposal of fireplace logs at favourable prices in urban centres, but in a technical sense, wood is not an efficient source of energy, and its use has to be justified by a low price which, at present, hardly meets the costs of extraction and delivery. It is, perhaps, only as a by-product of other forest or industrial activities that fuelwood can be justified as a source of industrial energy. There is a small amount of hardwood milling for flooring, furniture, and mine packs, and three pulpmills have the capacity to use approximately 413 000 m^3 (200 000 cords) per annum.

FIGURE 4
HARDWOOD SPECIES BY PER CENT



HARDWOOD VOLUME 96 900 000 m^3

INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

Industrial capacity in Nova Scotia declines in scale from east to west. The largest pulpmill, with a capacity to use approximately 1 320 000 m^3 (600 000 cords) of fibre per annum, is located on Cape Breton Island in the east. The long-term prospect under existing management policies, however, is that the softwood fibre stock in this area is being, or has been, depleted faster than the trees can be restored. In contrast, the western region has maintained, and is expected to maintain, a gross surplus of high quality fibre. There is thus a geographical imbalance in the prospective availability of fibre which will have a profound impact on the industrial and commercial aspects of the resource.

Foreign markets absorb almost all the output from Nova Scotia's pulp and paper mills, and about one fifth of the lumber products from the sawmills. Competition in these markets is intense, so that those suppliers whose source of raw material is secure and of superior quality have an advantage. The province can produce the very best quality, long, high-density, cellulose fibre, typically from red, black, and white spruce. Balsam fir, though less dense, can also provide good quality pulp and newsprint. Red and black spruce are highly regarded as sawlog material.

In the last forty years, there has been a rapid replacement of labour by capital. Muscle power operating the axe, saw, and horse-drag has been replaced by self-propelled tree harvesters and forwarders. Those who got a start in forest work when energy, enthusiasm, ability to file a cross-cut saw, and knowledge of how to deal with a team of cantankerous horses were all the qualifications necessary, may now find themselves required to deal with the intricacies of the transistor, the microchip, and the predictions of the computer. These advances in technology have been applied in every aspect of forestry, from inventory determination to harvesting and processing. The realities of the industrial environment, both now and in the future, must be squarely faced.

The introduction of new technologies, with the lure of reduced unit product cost, is often dependent upon scale to achieve its benefits. The large-scale operator and the vertically-integrated corporation (a company which grows trees, harvests, processes, and sells a final wood product such as lumber, pulp, or newsprint), are at a considerable advantage in maintaining commercially viable operations, and the more successful of these corporations have extended their activities across international frontiers, often in pursuit of secure sources of raw material. The small landholder, however, is precluded from the economies of scale by the initial capital requirements of modern methods, and small woodlots are often neglected, or even abandoned to decay and disease.

Nova Scotia has four vertically-integrated pulp and paper corporations. From time to time, these have been criticized for their silvicultural methods, industrial practices, relationships with the community, or simply because of their national origin. On the other hand, those who support the development of industry in the province argue that the corporations have fulfilled their legal commitments, maintained corporate responsibility, and made positive contributions to the forest industry in Nova Scotia by bringing skills, capital, and access to markets that could not have been as readily secured without them.

The social dimension of forestry has wide implications beyond the confines of the industry itself, thus involving political issues. The rise in population, the increase of affluence giving people greater opportunities for leisure, and the needs arising out of urban development, especially those related to water and waste disposal, have brought pressure to bear upon the environment. These factors have stimulated an awareness of the need to preserve and rehabilitate the environment. This is in marked contrast to the former view, which regarded the forest as an impediment to social progress, to be cleared by fair means or foul so that crops could be grown.

The Government of Nova Scotia has become increasingly responsive to public concern about environmental and recreational matters. While the Commission applauds this, it believes that with foresight and understanding, and with the adoption of well-established techniques of forest management, it is possible to implement an uncompromising policy to realize the forest's potential. With such a policy, not only could much more fibre for industrial purposes be safely produced in the province, but also environmental conditions would be enhanced.

There is an inadequate awareness, on the part of many Nova Scotians, of the importance of forestry as a source of employment, income, and social well-being. Argument, not always based on sound information or understanding, has arisen between the forest industry and the public, or at least those who claim to be speaking on the public's behalf. Resort has been made to government to seek resolution, frequently with the intention of imposing a specific view or of negating another's efforts, giving rise to heated confrontation and widespread confusion. Governments have been reluctant to act or to authorize actions upon which adverse comment has been passed. This has caused indecision and protracted delay in establishing a positive forest policy over the last decade. Given the long-term nature of forest resource development, this means that certain courses of action once open to Nova Scotians are no longer possible.

As early as the 1820s, government was seen to have a legitimate mandate for forest management, with the appointment of a Commissioner of Crown lands, and the requirement that pine stands be preserved for naval purposes on some of the earlier granted lands. Some people claim that government is responsible for all aspects of the resource, while others believe that government intrusion complicates matters and compromises technical and business issues by bringing political considerations to bear.

The social context is inevitably complicated by the fact that government is actively involved in the system. First, the Crown is a substantial landholder. This allows government to encourage forest development by its ability to make fibre available, and to secure funds to alleviate capital burdens, thereby generating employment and incomes. Second, government plays an important role in the evolution of new technologies by supporting research, and by acting on its results. Third, government regulates access to the forest, particularly on Crown land, but also on freehold. Fourth, government is expected to provide services which are beyond the financial capacity of individuals, outdoor recreation and wildlife sports being especially prominent in this context. Finally, the Crown receives a flow of revenue and taxation from forest-related sources, constituting government income worthy of support and maintenance.

Until the 1970s, fibre had always been available in relative abundance in Nova Scotia, so that little thought, if any, was devoted to rehabilitation. There had always been enough wood, and the only question was whether the axe could catch up with the forest. Experience had shown, notwithstanding persistent insect infestations and damage from diseases, that nature provided for the needs of all. The Commission believes, however, in the light of the consequences of the current spruce budworm infestation in eastern and northern Nova Scotia and, in particular, on Cape Breton Island, that a sound policy for forest rehabilitation and a strategy for its implementation are urgent necessities, if the forestry sector is to remain economically viable in Nova Scotia.

The report which follows does not claim to explore, in detail, all the numerous ramifications arising from the biological, industrial, and social aspects of the resource. By presenting a policy framework for the future management of Nova Scotia's forest, the Commission seeks to advise the Governor in Council on matters of broad policy, referring to specific details only for the purposes of illustration and explanation. The report is prospective, that is, it lays forth the forestry requirements and opportunities for the period of a minimum tree rotation of forty to fifty years. A policy is enunciated whereby the forest resource of Nova Scotia will achieve its potential within the limits of prudent, responsible management. The Commission acknowledges that the foundation for achieving this potential has been established by the Department of Lands and Forests, and the province's forest professionals.

The prerogative of determining a forest policy for the province of Nova Scotia lies with the provincial Crown. Having determined the policy to be pursued, the Crown should be prepared to provide the means of accomplishment, and to ensure that the intentions of the policy are fulfilled. The Commission envisages the Crown establishing a policy, as described in the Commission's mandate, "respecting all forest and related resources of Nova Scotia, their present and future importance to the economy and people of Nova Scotia, and the measures most appropriate to the preservation, protection, regeneration, enhancement, use of and production from forest lands and resources, including fish and wildlife, for the economic, social and other benefit of the people of Nova Scotia".

The forest of Nova Scotia, then, is a complex system, comprised of biological, industrial, and social aspects, and to disregard any of these would be to compromise the potential of the resource. Those involved with these specific aspects will have to know the tolerance of their own sphere, and be prepared to recognize the interests of the others, so that a working relationship can be achieved for all. The Commission believes that the people of Nova Scotia can meet the challenge of creating a healthy, productive forest, provided there is a willingness to accept reason, recognize scientific knowledge and procedure, and abandon dogma, especially when it cannot be reconciled with scientific conclusions or practical experience. The knowledge and skills are available; it is now essential to provide incentive, to generate enthusiasm, and to foster co-operation if this vital opportunity is to be seized, and if the forests of Nova Scotia are to be saved for the enjoyment and benefit of future generations.

Chapter I

Forest Crisis

The Problem

Everyone ought to be concerned about the present condition of Nova Scotia's forests. This resource has been diminished by highgrading, the ravages of fire, insects, diseases, weeds, and wind, and the failure of society to make the best use of the remaining trees and to restore forest losses. In consequence, many forest-related jobs are in jeopardy, and the environment is deteriorating.

Forestry experts worldwide believe that the abundant supply of naturally generated softwood trees, taken for granted in the past, is being seriously depleted in Nova Scotia and other temperate climate zones, and cannot regenerate to keep pace with consumption. This opinion is corroborated by the United Nations Food and Agricultural Committee on Forestry, which discussed the topic in May 1984 under the title **Forestry Beyond 2000 — Prospects and Problems in the Temperate Regions**.

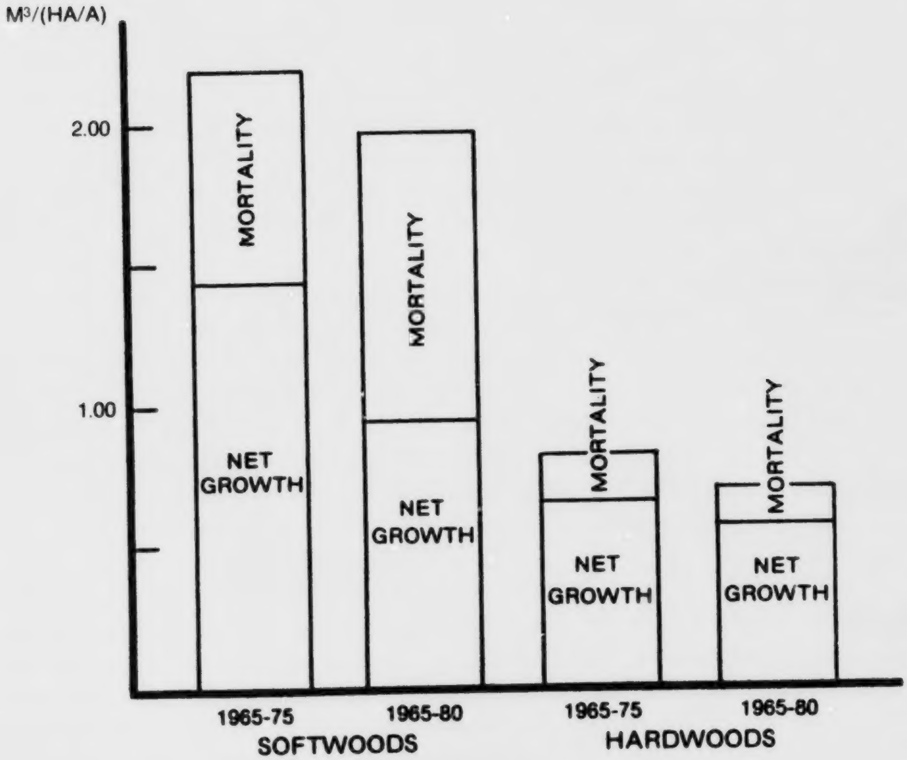
Unfortunately, the time span of the rotation, and the apparent abundance of the established forest, tend to conceal the approach of the catastrophe. Those who want to avoid the issues, or are unconvinced of the severity of the situation, can argue that there are plenty of green trees, that the province's wildlife populations are abundant, and that there is so much fibre available for industry that the economic return, whether for pulpwood or sawlogs, is minimal when the costs of extraction and transportation are deducted from the price allowed to the grower. "Are these the signs of an impending supply crisis?", is the question asked by those who either do not understand the quantitative realities of Nova Scotia's forestry system or, in the pursuit of personal objectives, do not want to recognize the facts of the forest's condition.

Whatever the motivations of the past, the facts of the present and the prospects for the future must be taken into account. Industrial requirements can be easily satisfied in the short run and, in fact, because of under-capacity operations and an abundance of mature and overmature material, more than satisfied. BUT BY APPROXIMATELY THE YEAR 2005, IF CURRENT FOREST PRACTICES ARE MAINTAINED, THERE WILL NOT BE ENOUGH RAW MATERIAL TO MEET THE NEEDS OF INDUSTRY IN THE

SEVEN EASTERN COUNTIES ON A SUSTAINED YIELD BASIS. Moreover, the United Nations Food and Agricultural Organization (FAO) has indicated that there will probably be a greatly increased worldwide demand for wood in the early part of the next century. Thus, those who have more fibre than they need should have no difficulty in finding markets. CONTINUATION OF CURRENT FOREST PRACTICES IN NOVA SCOTIA, HOWEVER, CAN ONLY LEAD TO AN EROSION OF THE RESOURCE, BECAUSE AN ADEQUATE LONG-TERM MANAGEMENT POLICY IS LACKING.

Although forest materials have been utilized since the earliest settlements, intensive use of the forest dates from the 1960s, and little silviculture was carried out before the 1970s. The industry has seldom found itself short of raw materials, and has rarely felt it imperative to renew its sources. According to some observers, wood extraction was pursued with an attitude epitomised by expressions such as "cut the best and leave the rest", and "cut and run". Furthermore, it is estimated that between 1965 and 1980 Nova Scotia lost over 4 200 000 m³ (1 900 000 cords) of fibre to decay, insects, and

FIGURE 5
NET GROWTH AND MORTALITY



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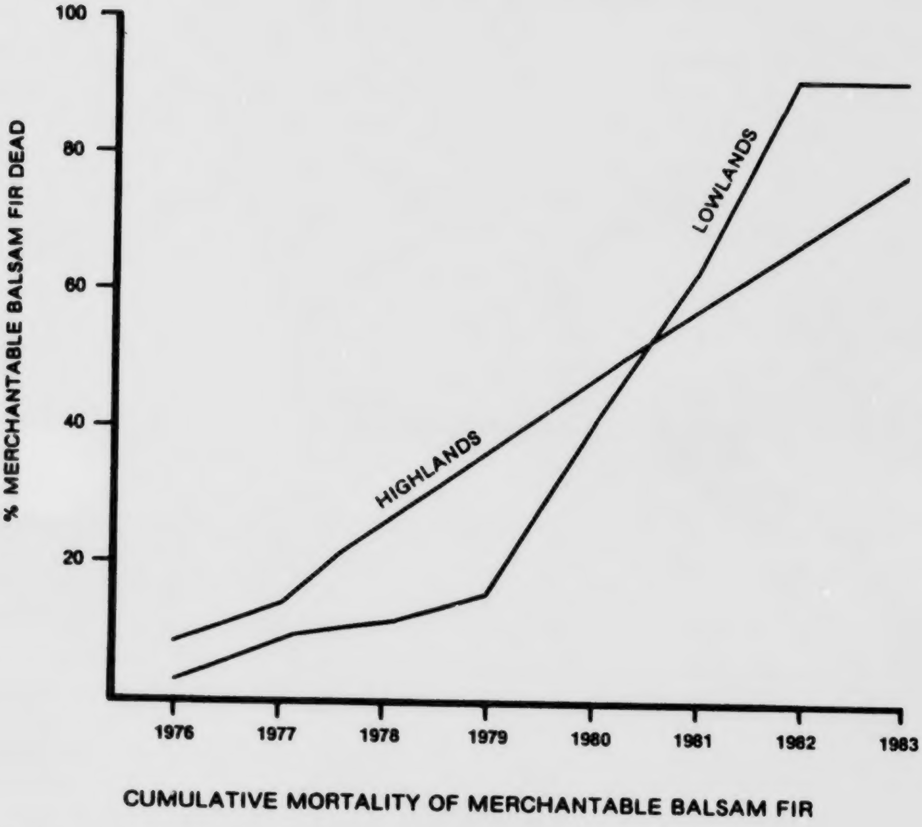
diseases annually. This loss represented more than was cut for commercial purposes annually, and if it had been possible to salvage this fibre, the industry could have doubled its present capacity.

The eastern spruce budworm (*Choristoneura fumiferana* (Clemens 1865)), has severely infested Cape Breton Island since the 1970s, with the result that, by current estimates, 22 000 000 m³ (10 000 000 cords) of fibre have been lost. This has given rise to a glut of raw material but, once dead, the fibre deteriorates after a few years, and becomes unusable for industrial purposes. Ninety per cent of stems on the Cape Breton Highlands is made up of balsam fir, of which seventy-seven per cent is now dead. Ninety-one per cent of the fir on the Cape Breton Lowlands is also dead.

FIGURE 6
CUMULATIVE MORTALITY OF MERCHANTABLE BALSAM FIR ON CAPE BRETON ISLAND



SOURCE: CANADIAN FORESTRY SERVICE, MARITIME FOREST RESEARCH CENTRE

The owners of sawmills in the seven eastern counties are currently experiencing a shortage of sawlog quality material. Furthermore, in about twenty years, there will be insufficient wood available from the seven eastern counties to supply the two pulpmills there, this shortfall continuing for about twenty years until sufficient wood can be obtained from current young stands. This situation can be avoided, however, if wood is gradually transferred into the east, and if overall forest management programmes are maintained from now on, as there is enough wood in the forests of central and western Nova Scotia to offset the shortfall, provided there is no further major loss.

Availability of suitable stands to supply the mills is a priority, with volume, quality, species mix, timing, location, and ownership all determining availability. Large amounts of high quality wood could be made available forty years from now, if forest management programmes are intensified. Until then, all wood harvested must come primarily from stands which are already growing. Most of the present softwood forest consists of stands between forty and eighty years old, but a gap exists between these and young stands. While taking care to preserve young stands, the forest must be harvested at the maximum rate which allows the old forest to be an uninterrupted source until it can be replaced by current young managed stands.

Producers in Nova Scotia have an established reputation as suppliers of good quality lumber, pulp, and paper products, but this reputation is of little avail if there is insufficient raw material to meet demand. Although there is now an apparent surfeit of raw material, if present practices continue there will be a gross insufficiency of raw material in relation to sales opportunities within twenty years. This situation will be caused by the fact that there are not enough young softwood trees, that existing efforts to replenish the tree inventory are not extensive enough, and that current programmes fail to protect the resource adequately.

Forty-one per cent of the existing softwood stock is mature to overmature, and another thirty-five per cent will be in these categories within the next twenty years. The present inventory has been estimated at 193 000 000 m^3 (87 000 000 cords) of softwood and 96 900 000 m^3 (46 900 000 cords) of hardwood. This is a very low stocking for an area of 4 100 000 ha (10 200 000 acres), and represents an average of only 63 m^3/ha (11 cords/acre) on the softwood stands, understandable in relation to past cutting practices, failure to restore after fire, losses due to insects and diseases, particularly on Cape Breton Island, and the fact that natural regeneration can be expected on only two hectares in three. Any fibre to be harvested in the next forty years must be growing now, and therefore forms part of the current inventory.

If current practices are maintained, industry would require 132 000 000 m^3 (60 000 000 cords) of softwood fibre in the next forty years, while normal losses would be at least 132 000 000 m^3 (60 000 000 cords) for an aggregate requirement for man and nature of 264 000 000 m^3 (120 000 000 cords). The qualification 'normal' is of particular relevance; an abnormal experience, such as that which occurred on Cape Breton Island in the 1970s, on, say, the slopes of the Annapolis Valley or in northern Nova Scotia, would greatly limit the supply, and force many operators out of business.

The forest land base of the province, given proper tending, is more than capable of sustaining the requirements of the existing forest industry and of providing wildlife and recreation needs, but the forest, as currently managed, will not yield sufficient raw material to meet the needs of industry in the near future. There is, therefore, an impending crisis with potentially disastrous social consequences. But this crisis can be resolved by determined action, thereby increasing opportunities for employment in the cultivation of trees, creating a healthier, more secure forest, enhancing wildlife habitat, and enabling the industry to participate in an expanded commercial market. The Commission has examined a number of alternative courses of action: the **laissez-faire**, the **status quo**, the **conservancy**, the **sawlog forest**, the **industrial biomass**, and the **species selection** options. The implications of these will now be examined.

The Options

Option One: **Laissez-faire**

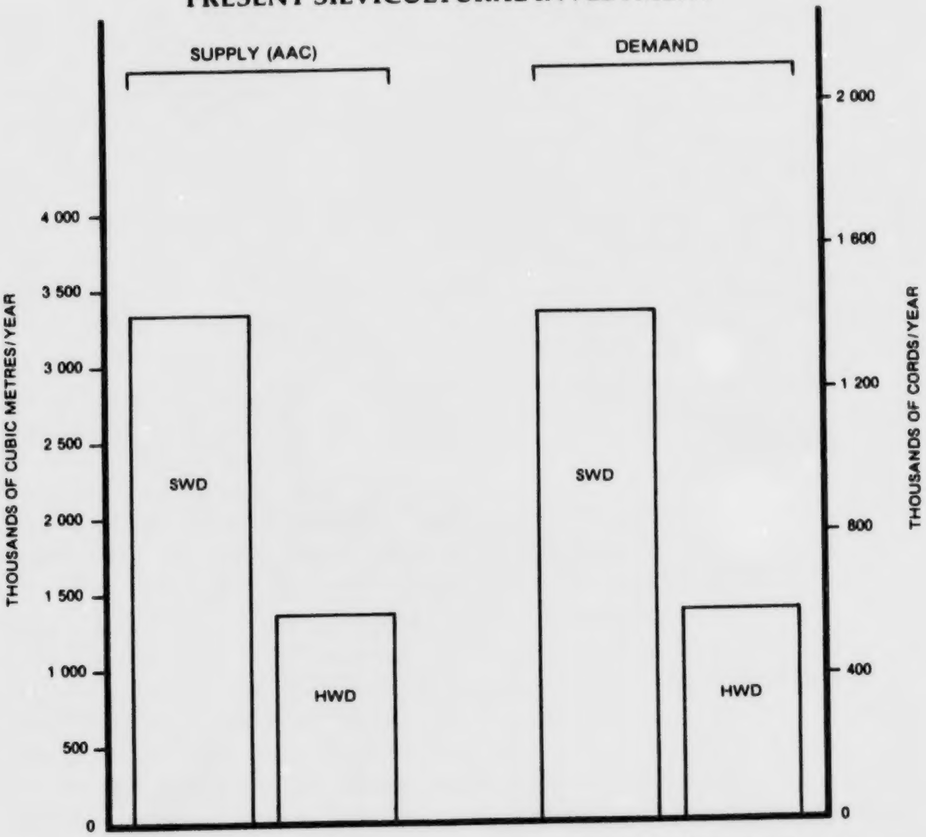
By the term **laissez-faire**, the Commission understands a policy of non-interference, of letting nature take its course. This policy would require little in terms of forest management, reducing expenditures considerably. Furthermore, there would be much less licensing of Crown land to industry for cutting purposes, which would provide freer public access to the forest for harvesting, hunting, fishing, and other recreation.

Left to regenerate itself, however, with unchecked harvesting and high-grading, and the combined effect of lack of protection from insects, fire, wind, and diseases, no weeding, no spacing, no planting, no upgrading of skills, no surveys, and no educational programmes, the forest would be rapidly run down. The Commission estimates that within a generation there would be a serious shortage of raw material to operate the mills at their current capacities, and that failure to maintain silvicultural activity at the present level for a full rotation (at least forty years) would lead to a drastic reduction of the annual allowable cut, resulting in a reduction of the forestry work-force, and causing widespread distress in areas largely dependent upon forest industries.

If the **laissez-faire** Option were implemented, responsible management of the forest would be abandoned, and therefore all wildlife management programmes would be discontinued, to the detriment of the stock. Wildlife protection policies have been pursued continuously in Nova Scotia since 1794, and have played an important role in keeping wildlife populations in the flourishing condition they are today. Furthermore, the aesthetic quality of the forest would decline as a result of neglect, reducing recreational pleasures, and having a negative impact on the tourist industry.

It can be speculated that many social problems would result from such losses. The Government would have to shoulder the expense of unemployment benefits and other welfare payments, and the young would be forced, even more than they are now, to look for work outside their locality or the province in a market where it is difficult enough already to find employment. There might also be a great increase of medical problems associated with psychological stress and physical inactivity, not to speak of the likelihood of social unrest and an increase of vandalism. Communities which rely almost exclusively on forest-related industries would be greatly impoverished and largely deprived of their young and vigorous members. Not only would the productivity of at least the pulp and sawmill sectors be diminished, but the industry as a whole would lose a sense of direction and purpose. This would probably result in a pressing urge to expand, on the part of large commercial operators, to control the industry for their own ends for short-term objectives,

FIGURE 7
ANNUAL ALLOWABLE CUT
PRESENT SILVICULTURAL INVESTMENT



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forcing smaller operations out of business, thereby hastening the destruction of the resource.

Option Two: the **Status quo**

Option Two would involve maintaining the present level of silvicultural investment - the harvesting of 3 300 000 m³ (1 500 000 cords) of softwood and 1 240 000 m³ (600 000 cords) of hardwood annually - allowing the annual softwood harvest to rise to 4 000 000 m³ (1 800 000 cords) by the year 2040. This would continue to strengthen the rural fabric by sustaining employment and income opportunities, reduce the number of high-risk stands by shortening the rotation, and create employment for silviculture workers.

At this level, however, the resource would still be utilized far below its potential, because those managing the forests are merely attempting to supply sufficient fibre to sustain the industry at existing capacities, allowing for an eventual yield approximating to the current level of less than 1.5 m³/(ha.a) (0.27 cords/acre/year). Informed estimates suggest that two to three times the present average volume per hectare per annum ought to be attainable in Nova Scotia, which is still far below the potential.

Option Two would make no provision for managing hardwoods, and would contain no effective method of encouraging woodlot owners to participate in the softwood management programme. Forest inventories over the years have indicated normal annual losses from fire, insects, diseases, and wind, to be approximately 3 300 000 m³ (1 500 000 cords). If losses were to exceed this amount, the choice would be either (i) to overcut the forest intentionally year by year, resulting in a depletion of the resource, or (ii) to take stringent measures to minimize forecasted defoliation and other loss. Failure to adopt protection policies would create a situation similar to that described in Option One, but with the added disadvantage of risking the loss of previous silvicultural investments.

Option Three: **Conservancy**

Option Three would necessitate the implementation of a programme of forest restoration, conservation, and improvement, with initial expenditures of $20 000 000 per annum. These funds would be spent on scheduling, allocation, marketing, silviculture, and protection, to ensure that a sufficient volume of high quality fibre would become available by the target dates.

This would call for a forest management programme dedicated to increasing the volume of fibre available from the forests of Nova Scotia to at least 7 770 000 m³ (3 600 000 cords) per annum by the years 2030-40, made up of approximately 5 500 000 m³ (2 500 000 cords) of softwood, and 2 270 000 m³ (1 100 000 cords) of hardwood. This would allow for much greater industrial activity, increase opportunities for employment and recreation, provide better wildlife habitat management, and create a higher quality, healthier, and more aesthetically pleasing forest.

The number of hectares to be managed in any one year would depend upon a number of circumstances, including (a) the evolving condition of the forest; (b) woodlot owner participation; (c) availability of trained labour; (d) industrial capacity; (e) environmental conditions; (f) market conditions. Under propitious circumstances, alternative industrial opportunities and further export markets would develop, for a world pulp, paper, and lumber market that the FAO calculates will have greatly expanded; Nova Scotia could take advantage of these opportunities, if it were prepared. Furthermore, the management policy proposed in Option Three would create a buffer, enabling the industry both to cope with losses and to prepare for expanded markets.

Option Four: The **Sawlog forest**

Option Four would require the cultivation of the forests to generate the maximum amount of sawlog material, a pursuit which has its attractions because this product has a higher value than pulpwood. Other advantages of this Option would be the creation of a better quality and more aesthetically pleasing forest, and the boosting of the economies of rural areas because a larger proportion of the product dollar is earned locally. The province has had a traditional role in this field for over two centuries, founded upon pine and spruce. Both at the forest and at the processing level the industry has been relatively labour-intensive, but recently the supply of good sawlog material has diminished, so that the promotion of a forest geared to sawlog production would require substantial silvicultural activities, particularly spacing, and a longer rotation period.

It has been argued that the difference between profit and loss for sawmills is determined by the sawmiller's opportunities to dispose of by-products, especially chips for pulping, and to a smaller extent shavings for bedding, and sawdust and bark for fuel, so that a viable sawlog industry would require a complementary pulp industry to provide markets for chips. Pulp activities need consistent supplies of raw material to maintain economic viability.

Option Four would also necessitate an extensive development of market outlets. Producers in Nova Scotia may find it very difficult to acquire sufficient market outlets of commercial significance, as they would have to compete with large-scale operations such as the forest industries of Quebec, British Columbia, west-coast United States, and Scandinavia, which have firmly established markets based on lumber products. However, Nova Scotia has convenient sea access to the United States eastern seaboard, and western Europe. Thus, a secure supply capability of high quality wood products ought to be marketable through the industry's established connections.

If this strategy were to be adopted, a completely updated infrastructure would be required. There would also be less value added than in the pulp sector, but perhaps greater security over-all in the diversity of markets being served.

Option Five: **Industrial biomass**

Under Option Five the forest would be managed to generate low grade fibre for biomass industries. The manufacture of cellulose and rayon materials, feed-stock for wood-alcohol plants and chemical industries, or biomass for fuel, depends upon massive quantities of low cost cellulose. This would require substantial investment in capital equipment and industrial plant, as these activities are capital intensive and dependent on ready access to markets.

Many silvicultural operations generate low quality and undersized material which is currently left in the woods, as it has little or no value, but if it could displace heavy fuel oil or bunker C oil in the boilers, it would be a source of energy to which a monetary value could be attached. Three of the larger pulp facilities now have industrial boilers designed to utilize biomass, and there are at least another ten businesses in the province which currently use large amounts of biomass for energy.

This Option would have several advantages: existing stands of low grade trees could be easily disposed of, and some employment opportunities would be created for harvesting and transportation. In contrast, employment and income opportunities in secondary industries such as textiles would be scarce, since manufacturers prefer to be in close proximity to final markets.

Option Six: **Species selection**

Option Six would involve the creation of policies and the pursuit of procedures to eliminate budworm-susceptible species, primarily balsam fir and white spruce. While this Option could include such aims as the evolution of faster-growing species, the depredations of the spruce budworm makes the elimination of the most susceptible species a priority.

In some respects, this Option would require actions akin to those outlined in Option Five - the establishment of short-term processing plants to absorb massive quantities of fibre, either for the production of low grade pulp or materials for biomass industries. This intensive harvesting would have to be followed up by sufficient replanting to sustain alternative non-susceptible species.

While hardwoods grow in most areas of the province, especially on the mainland, it would be difficult and time-consuming to convert softwood stands to hardwood, and the markets would be uncertain. Since many countries are growing a higher quality hardwood more quickly and more cheaply than could be accomplished in Nova Scotia, and are closer to markets, the province would be at a permanent disadvantage in the world market.

The current quality of hardwoods in the province, including yellow birch, is relatively poor and, for the most part, not sawlog material. A fast-growing hybrid poplar has been suggested as ideal for growth in Nova Scotia, but since it would need to be planted on prime agricultural land, its usefulness is questionable.

There would be three further disadvantages: softwood regenerates naturally on much of the land in the province, and would continually compete with the hardwoods planted; the rotation period for the more valuable hardwood varieties is longer than that required for softwood species; and the soils and climate of Nova Scotia are more suited to softwood species, making the establishment of high quality hardwoods very difficult.

While a more varied and less budworm-susceptible forest might be expected under Option Six, the initial costs would be heavy. Maintenance would also be costly, as a new pattern of industry would have had to be established by the end of the rotation to avail of the emerging fibre. Furthermore, the ultimate returns of such a policy would be uncertain, as there is no tree species which is completely resistant to insects and diseases.

The Solution

The Commission has examined the above six Options in great detail, and, having projected the probable outcome of each one, is convinced that the implementation of Option Three would be the most practical and realistic course of action. It believes that Option One is completely unacceptable, and that Option Two does not recognize the forest's potential, fails to protect the resource adequately, lacks a clear long-term forest management policy, and therefore cannot offer social stability. The Commission believes that Options Four, Five, and Six would be inadequate policies, if taken singly, but that the Conservancy Option ought to include the best elements of these Options. **THE COMMISSION THEREFORE STRONGLY RECOMMENDS THAT THE CONSERVANCY OPTION AND THE BEST ELEMENTS OF OPTIONS FOUR, FIVE, AND SIX BE ADOPTED AND IMPLEMENTED AS SOON AS POSSIBLE**. The implications of this Option (henceforth called the Conservancy Policy or the Conservancy Programme), and the forestry infrastructure necessary for its successful implementation, are described below.

The Conservancy Policy will require a comprehensive programme for the restoration, conservation, and improvement of Nova Scotia's forests. By **restoration**, the Commission means a programme of rehabilitation to ensure the optimum use of suitable forest land. **Conservation** in this report means the preservation and maintenance of the forest environment, and the best use of all wood fibre available in the province. **Improvement** is to be understood in this report as the enhancement of every aspect of the forest environment, including aesthetic quality, the protection of watercourses and wildlife, and the promotion of a healthy stock of trees.

Far from being unable to sustain a yield of 3 300 000 m³ (1 500 000 cords) of softwood and 1 240 000 m³ (600 000 cords) of hardwood beyond the 1990s, the forest management programmes required by the Conservancy Policy will increase the combined annual allowable cut from 4 540 000 m³ (2 100 000 cords) to a minimum of 7 770 000 m³ (3 600 000 cords), which will greatly increase employment and income opportunities, strengthen industrial development, enhance recreational facilities, and provide the basis of a healthier forest for centuries to come.

This Policy will be comprised of five components:

1. **Scheduling:** a timetabled harvesting of the forest so that the most appropriate wood is cut at the optimum time;
2. **Allocation:** to ensure that the **best end use** is achieved for each tree removed in the annual harvest;
3. **Marketing:** a monitoring and assistance, as necessary, of the commercial facets of the resource, to maintain the efficiency of all participants in the production process;
4. **Silviculture:** a programme of forest cultivation, including planting, thinning, fertilizing, and drainage, to ensure a time-determined availability of trees;
5. **Protection:** a commitment to prepare for, take action to counteract or minimize, any avoidable forest hazard, including fire, insects, weeds, wind, or diseases.

The above five headings will be elaborated in the next chapter, "Forest Management". These components are all equally essential, as failure to maintain any one would destroy the Policy and its objectives. Furthermore, if each of these activities were to be pursued locally and in isolation, very little progress would be made. It is, for example, possible to practice silviculture without managing. Each activity must therefore be performed in the context of an over-all management plan (the Conservancy Policy), and all local efforts must be co-ordinated to contribute to this plan. Good forestry is the skilful orchestration of these components towards the goal of a healthy forest and an increased, sustainable, harvest.

The Commission is convinced that the success of the Conservancy Policy will depend upon gaining the willing participation of private woodlot owners, who collectively are the proprietors of as much as 2 150 000 ha (5 300 000 acres) of the best forest land. The Commission would therefore prefer to see the objectives of the Policy accomplished with minimum resort to legislation, and believes that, with improved co-operation, these goals are attainable by a combination of institutional arrangements and fiscal means. If voluntary response proves disappointing, legislation should be considered as a final resort.

The Commission recommends the following as requirements of the Conservancy Policy:

Establishment of manpower training programmes for potential silviculture workers;

Restructuring of agreements and acts with industry, especially those concerned with the management of the resource, for the benefit of all concerned;

Development of cost-sharing programmes and long-term agreements between the Federal and Provincial Governments and industry;

Increase of stumpage prices paid to the private woodlot owner and the Crown, on the basis of quality;

Development of a modern system for the transport of pulp, sawlogs, and other forest products, either by road, rail, or sea, to minimize cross-hauling, and to ensure the distribution of sufficient fibre for industrial purposes, particularly during the period of shortage in the seven eastern counties;

Establishment of an Office of the Deputy Minister of Forestry within the Department of Lands and Forests, with the responsibility for restoring, conserving, and improving the resource, with appropriate professional and technical staff to guide the management of both private and Crown land by meeting the requirements of scheduling, allocation, marketing, silviculture, and protection;

Appointment of a Deputy Minister of Forestry , responsible for improving the quality and increasing the quantity of fibre, and for seeing that the forest is used, maintained, and improved in the light of contemporary social and economic circumstances. The Deputy Minister of Forestry will furthermore be required to establish and promote programmes of research and technical transfer, to inform and advise all sectors of society on the rationales, techniques, and economics of the industry, and also to ensure that sufficiently skilled personnel are available to carry out the mandate. (The terms of reference for the Deputy Minister of Forestry are outlined in Appendix III.) **As a corollary, it is recommended that a Deputy Minister of Lands be appointed to be responsible for the administration of all existing functions of the Department of Lands and Forests not assigned to the Office of the Deputy Minister of Forestry;**

Establishment of an Inspectorate of Woods with responsibilities and powers analogous to the Auditor General's Office. This Office will be separate from the Department of Lands and Forests, and will serve as a monitor on all aspects of forest management within the purview of the Department. (The terms of reference for the Inspectorate of Woods are outlined in Appendix III);

Appointment of an Inspector of Woods who will report to the Legislature on the progress of the Conservancy Programme once a year, though the technical nature of the assessments best lends itself to a five-year time-scale, and this will be reflected in the form of reporting;

Development of a comprehensive forest extension service to disseminate technical information, to ensure that the fullest advice and assistance is made available to the public, to conduct practical technical sessions for woodlot owners, and to have management plans prepared and followed up with technical expertise regularly. More effective methods of liaison with the woodlot owners will have to be found, and suitably qualified personnel appointed. Because seventy-three per cent of the forested land in Nova Scotia is in private hands, and because the participation of non-industrial forest landowners is essential for the effective management of the forest under any provincial policy, there ought to be a concerted effort to develop extension courses in University programmes. **The Commission therefore recommends that an approach be made to the University of New Brunswick, with a request to develop a specialized one-year programme leading to a Master of Forestry, designed to enhance the skills of those who desire to enter the extension field;**

Preparation of management plans, consistent with the Conservancy Policy, to be entered into by private woodlot owners, which must include a commitment from the landowner, his heirs and assigns, to follow the plan to its completion. To repay the participating landowner for this commitment, the province will abate property taxes on the land concerned, provide silvicultural assistance in the form of cash payments, technical and professional expertise, and ensure the landowner a market for his product at the time of harvest. It is intended, by these means, to encourage landowners to commit their lands to forest management for the period of a full rotation. In addition, the province will monitor insect, disease, and fire hazard conditions in the forests and provide protection as required. Those who do not participate will be taxed as speculative landholders;

Consideration of opportunities for the use of an additional 2 200 000 m³ (1 000 000 cords) of softwood and a further 1 030 000 m³ (500 000 cords) of hardwood per annum that will become available in the course of the rotation. The expected annual volume of fibre available from 1985 to 2040 is as follows:

Year	Softwood (000's)		Hardwood (000's)		Total (000's)	
	m³	Cords	m³	Cords	m³	Cords
1985	3 960	1 800	1 860	900	5 820	2 700
1990	4 070	1 850	1 860	900	5 930	2 750
2020	4 620	2 100	1 960	950	6 580	3 050
2040	5 500	2 500	2 270	1 100	7 770	3 600

There are several forest or nature organizations in Nova Scotia which are constitutionally autonomous. Some of these are funded to varying degrees from government sources. It has become an increasingly difficult task to co-ordinate these organizations, and to ensure that they are pursuing government policies. There is no doubt that autonomous organizations have contributed much to the resource, but they tend to be as effective as the enthusiasm of their participants allows, and this is variable. Moreover, they sometimes cannot agree upon the most effective ways of proceeding, even if they could agree on the validity of any particular policy. A partial list of organizations which have received funding in the past is given in Appendix IV.

Since the pursuit of conflicting policies and procedures can only lead to confusion and inefficiency, the Commission recommends the phasing out of all forms of funding provided by government to autonomous organizations, and the redirection of these funds to the Office of the Deputy Minister of Forestry. The Crown will then determine the most appropriate means of accomplishing the objectives of the Conservancy Policy. Autonomous organizations have a vital role in maintaining public and professional understanding of the resource, and it is desirable that they have formal means of communicating with government. **The Commission therefore further recommends that lines of communication be established between autonomous organizations and the Inspectorate of Woods.**

As there has been no formal provincial forest policy in the past, government departments have acted as they have seen fit in making monies available to resource-based industries, either by grant or low-interest loan. **The Commission recommends that the Deputy Minister of Forestry be responsible for determining whether any proposed industrial development is compatible with the obligations and potential of the resource, before any government department or agency makes monies available.**

It is uncertain whether taxation hinders or promotes the forest industry in Nova Scotia. While no one can argue that the present level of land taxation is burdensome, industry representatives have indicated that they regard the two-rate approach as discriminatory. It could be argued that, by imposing negligible obligation, the present approach to land taxation aids speculation and condones neglect. The resource as a whole, however, suffers from under-investment, so to change taxation simply for the sake of generating revenue would not only be futile but also potentially counter-productive.

In 1978, the province adopted a policy whereby the municipalities levied a standard rate of taxation on resource land of sixty-two cents per hectare (twenty-five cents per acre) per annum on holdings of 20 200 ha (50 000 acres) or less, and one dollar per hectare (forty cents per acre) per annum on those more than 20 200 ha (50 000 acres), without regard to assessment values. In some cases, the revenue from this tax does not meet the cost of administration.

The financial proceeds of harvesting are treated as a capital liquidation, and assessed accordingly for income tax purposes. The Commission supports the maintenance of this arrangement.

The Commission recommends the establishment of fiscal measures to promote participation in the Conservancy Policy, and further recommends that the costs associated with management and administration be partially funded by raising the present levy on forest land initially to a standard tax of $2.50/ha ($1.00/acre).

The Conservancy Programme will allow for the immediate harvesting of an additional 660 000 m^3 (300 000 cords) per annum of mature, overmature, and diseased fibre, for which markets must be found. Short-term markets will also be required for undersized and low quality fibre because of a doubling of silvicultural activities. Markets might possibly be obtained by exporting more wood or using more fibre for biomass.

On the adoption of the long-term management philosophy envisioned by the Commission, existing industries should be quick to expand their management and industrial operations based on a secure, competitive and quality wood supply. In addition, entrepreneurs will be encouraged to finance sawmills and pulp and paper mills in the province. This ought to result in an increase of employment and income opportunities, and a further social stabilization of rural areas.

Chapter II

Forest Management

The Practice of Forestry

The Society of American Foresters and the Canadian Institute of Forestry define forestry as "the science, the art, and the practice of managing and using for human benefit the natural resources that occur on and in association with **forest lands". Good forestry,** in the view of the Commission, also demands **biological responsibility** and an understanding of the business realities and **social and political processes** involved.

The Commission received many submissions concerned with practices that ought not to be performed in the forests of Nova Scotia. In particular, advice was received on cutting practices, treatment of trees and stands, species maintenance, the utilization of wood materials, and the preservation of flora and fauna. The Commission considered all these to determine whether it would be appropriate to make formal recommendations, and many of these topics are dealt with in detail elsewhere in this report.

The Commission is convinced that, given the wide diversity of soils, climate, natural vegetation, and ownership in Nova Scotia, it would be improper to prescribe detailed rules or laws for the conduct of the forester's art. It is more appropriate, given such diversity, to recommend policies to enable those who pursue the arts and sciences of forestry to maintain the best possible standards. Foresters ought to be allowed to find ways to accomplish the objectives of good forestry with the minimum of interference, subject to the obligation to pursue scientific forest management while preserving the integrity of the environment, and the health and safety of society.

Each aspect of the forest environment presents unique problems. The forester's responsibility is to assess each situation in the light of the over-all management policy, and, using professional judgement, determine the best course of action for dealing with particular trees or stands in the context of the whole forest. The Commission observed situations where efforts had been made to prescribe practices and procedures for the maintenance and use of the forests. Professional comment on some of these prescriptions described them as impractical and having little or no relationship to knowledge or experience. In the final analysis, advocating impractical procedures can only give rise to ridicule.

Concerns were also expressed that modern methods are detrimental to wildlife, aquaculture, water quality, and historic accumulations of genetic material, and that a plantation approach would cause monocultures and soil depletion. The Commission could find no technical substantiation for such contentions, and believes that Nova Scotia's forests and waters can be enhanced by the pursuit of responsible forest management.

Considerable concern was expressed about cutting methods, in particular that the practice of clearcutting is detrimental to the environment. Forestry experts indicated that clearcutting is often, but not universally, a most effective way of harvesting or dealing with a particular situation, and stressed that there is no rule that ought to be applied without exception. Some people argued for shelterwood cutting, while others advocated the promotion of what they called "selective cutting", not realizing that such cutting is tantamount to the poor practice of highgrading. Again, the Commission concludes that there is no hard and fast rule that ought to be imposed. The form of harvest should be determined by the nature of the trees involved, soil conditions, and location, as well as the forest management objective being pursued.

In addition, there were comments to the effect that forest practices might detract from recreational opportunities or the interests of tourism. The forests of Nova Scotia are sufficiently extensive to provide recreational and tourist amenities, notwithstanding the likelihood of forestry activities taking place at any one time.

Finally, there were submissions of a social nature, including concerns about the danger to public safety caused by hunters or as a consequence of protective spraying. The Commission believes that approved forestry practices should in no way occasion alarm or fear for life and limb on the part of the public.

Modern forestry is compatible with social responsibility. The Commission has every confidence that those who have pursued the study of forestry and its related arts and sciences, and have been instructed to bring about the restoration, conservation, and improvement of forests in the province, will be capable of doing so while enhancing the environment and respecting the diverse interests involved.

Scheduling, Allocation, and Marketing

Scheduling, allocation, and marketing are so interdependent and interrelated that it is necessary to deal with them under a single heading. The implementation of the Conservancy Policy will require an organization to ensure scheduling, allocation, and marketing programmes are priorities in the rehabilitation of the forest. These procedures are intended to make the best use of available materials, while endeavouring to satisfy the needs of people dependent upon the resource for their livelihoods or expecting to use the forest for recreational purposes.

Scheduling determines with precision when harvesting should take place, which stands of trees to cut, and how much to cut, and aims at preserving trees until maturity so that the supply of fibre will be sustained. Furthermore, proper scheduling reduces the number of overmature trees, such trees being especially vulnerable to insects and diseases. Although there are biological limits to what can be done, the ultimate objective is a schedule of cutting to maintain a consistent flow of mature high quality raw material to meet industrial needs, and the identification of the best use for raw material is essential before deciding which trees or stands should be cut.

Allocation is the directing of forest materials to the most appropriate use. Theoretically, only pulp and pulpable materials ought to be directed to pulpmills, and sawlogs should be sent exclusively to sawmills. However, circumstances may arise making it necessary to take production obligations into account, so that it may not always be possible to direct fibre in what seems to be the most appropriate manner. Sawlog quality material will usually be directed to sawmills, and not used for pulp or energy purposes, but this ought not to be inflexible. Best use must therefore allow for all the circumstances of the period when the fibre becomes available or must be used, and those organizing allocation must be allowed sufficient discretion to obtain the best solution to the problem of directing fibre in relation to conditions existing at the time, and within the framework of the Conservancy Policy.

Marketing, the key to effective allocation, is made possible by individuals able to buy and sell raw materials and finished products in such a way that participants at every level of the production process remain efficient. Market procedures must be promoted so that there is information available to all participants, and a recognition of market conditions directly or indirectly related to the Nova Scotian situation. Given the expectations noted above, those directing marketing will not only have to deal with both surplus and extreme scarcity of raw materials over the period of the first new forest rotation, but also with a variable range of qualities, against a background of world markets where similar conditions are expected to prevail. The challenge will be to secure such a return for all involved, so that they will be encouraged to participate in scheduling, allocation, and marketing programmes.

Administered prices have always created a situation in which one or both sides of the market have been dissatisfied, and the institution of price administration would probably yield no better results in the sale and purchase of forest products. It would therefore be desirable to encourage the development of open competitive markets for raw material, which are most effective when the forces of supply and demand are balanced. That condition is not likely to be fulfilled for pulp up to about the year 2005, but there is now an opportunity to promote open competitive markets for sawlog material. The competitive bidding process will be discussed under the heading "Sawmills".

The marketing of pulp materials will be much more complicated, especially in the first twenty years after the introduction of the Conservancy Programme. In that period, the potential output of softwood fibre from Nova

Scotia's forests could approach 4 400 000 m³ (2 000 000 cords) annually, whereas present industrial capacity requires 2 640 000 m³ (1 200 000 cords) of pulpwood per annum. During this early period of intensive forest management, those in charge of marketing must find ways to sell surplus low quality raw material - outlets can be suggested in terms of (a) increasing industrial capacity, (b) seeking new forms of industrial use, (c) pursuing new export markets for raw material, or expanding existing export markets. Most of the end-product of the forest is and will be sold against world competition, and Nova Scotian producers cannot, and should not, be shielded from such competition. As a balance is approached between the sources of supply and potential demands for pulpwood, it would be desirable to hold regular public auctions of these materials.

Advice presented to the Commission tended to discount any prospect of an expansion of industrial capacity in the near future. On the contrary, repeated submissions, on the part of various sectors of the wood processing industry, emphasized the concern that current forest management practices will not even generate sufficient fibre to maintain existing capacity levels beyond the immediate future. There will thus be a challenge to find opportunities under the categories noted above. While expansion of raw material export sales generates good returns for relatively short periods, none of the value added benefits associated with raw material accrue to Nova Scotia, and the Commission would prefer to see the surplus absorbed by the development of a new processing undertaking, or a substantial increase on the part of established operators.

An accurate and detailed knowledge of the tree stock and its condition, preferably on a stand-by-stand basis, is essential for the operation of scheduling, allocation, and marketing programmes. There is little point in recommending that old or highly susceptible trees should be harvested first, if one is not able to locate those particular trees precisely in the forest. Electronic technology now offers, or will soon be able to offer, means of creating and maintaining detailed inventories at relatively low cost. Moreover, satellite applications promise even more speedy reporting through remote sensing techniques which alleviate much of the tedium of data collection. **Since effective scheduling, allocation, and marketing programmes must avail of up-to-date data processing techniques, the Commission recommends the establishment of a computer-based mapping system for all forested land in the province.**

Those directing scheduling, allocation, and marketing programmes will have to deal with a widely different set of challenges as the Conservancy Policy is implemented and as the new forest grows. Initially, there will be a surplus of raw material, especially of pulp and biomass, and then a phase of severely constrained supply, particularly of sawlog material, will occur until the new forest is ready to be harvested. This topic will be further discussed under the heading "Markets".

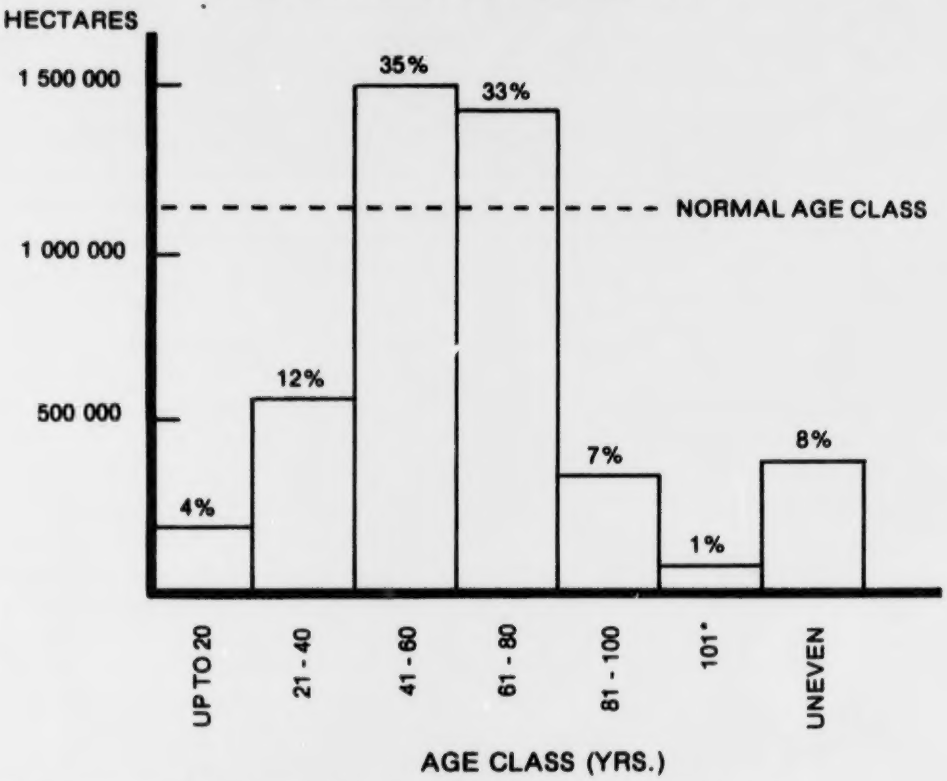
The expected situations, in general terms, are as follows:

(a) Of the existing stock of softwood fibre - 193 000 000 m³ (87 000 000 cords) - forty-one per cent is mature to overmature. These trees are ready to be harvested now, so for the next two decades, Nova Scotia's forest could yield softwood fibre at an annual rate of 4 000 000 m³ (1 800 000 cords) plus increment, but the industrial capacity of the province on average absorbs 3 300 000 m³ (1 500 000 cords) annually. There is currently, therefore, an excess of supply over demand, the market is glutted, and prices to woodgrowers are depressed, so that at approximately forty-one dollars a cord roadside, revenue barely meets the cost of extraction. In numerical terms, forty-one per cent of the softwood fibre stock represents 78 000 000 m³ (35 500 000 cords). From now until the year 2005, the Deputy Minister of Forestry will have to see that this stock is harvested, or it will begin to deteriorate to the detriment of all users, particularly in the seven eastern counties. This will only be successfully achieved by careful scheduling, proper allocation, and aggressive marketing.

(b) A further thirty-five per cent of the stock is forty-one to sixty years of age, and will be mature or overmature in the course of the next twenty years. A significant portion of these trees would normally be expected to be harvested in the coming decades and, under normal husbandry, would be expected to displace the mature and overmature woods in the inventory, as identified in (a) above. The forty-one to sixty-year stock can only aggravate the short-term surfeit of low quality fibre, and to the extent that this stock is cut during the next twenty years, there will be inadequate supplies in the period 2005-2025. Again, scheduling can reduce the adverse consequences considerably.

(c) Twelve per cent of the softwood inventory is between twenty-one and forty years of age, four per cent is under twenty years of age, and the remaining eight per cent is comprised of uneven-aged stands. In forty years, when the stocks represented in (a) and (b) have been exhausted, either by harvesting or as a result of decay, insects, diseases, or windfall, there will be insufficient mature trees to meet industrial and recreational needs, unless scheduling targets are met.

FIGURE 8
AREA AND AGE CLASS DISTRIBUTION



INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

SCHEDULING IS THEREFORE MANDATORY TO MAINTAIN THE PRESENT AND FUTURE NEEDS OF THE INDUSTRY. THIS IS NOT JUST A PAPER EXERCISE; IT MUST OCCUR IN THE FOREST. To cut young trees while older fibre is available is to eliminate potential future supply. If the scheduling, allocation, and marketing of fibre is not closely monitored, it is easy to envisage a scrambling for wood supplies on the part of such pulp or sawmills as might remain in the five or ten years before the supply of trees needed to maintain a viable industry is exhausted. This situation must be avoided.

Silviculture

The growth of good quality, healthy trees is enhanced by the application of silvicultural techniques. Silviculture consists of many different activities, including planting, thinning to allow room for growth, and suppression of competing vegetation. These treatments must be carried out on a stand-by-stand basis; there is no universal formula. The art of silviculture is carried out locally, but foresters and forest technicians must be aware that their activities form part of the over-all management of the forest. This requires an understanding of the purpose for which the particular stand is being developed, biological knowledge of the species involved, and an appreciation of environmental conditions. The Commission believes that a properly managed forest would eventually supply sufficient fibre in the appropriate form, such as pulpwood, sawlogs, fuelwood, and biomass for energy, to meet the needs of society.

Silviculture requires substantial effort, but the return on such maintenance is demonstrably great, with the prospect of increasing per hectare yields as much as 1 000 per cent. In Nova Scotia, silviculture could increase the yields of the existing forest, prepare the way for an enhanced resource, generate further direct and indirect employment opportunities for up to 10 000 individuals, while improving the wildlife habitat and the health and appearance of the forest. Without the pursuit of silviculture as part of an over-all management policy, the longer-term prospect is one of continuous erosion, insufficient renewal, and ultimate abandonment of most industrial activities in the forest.

The Commission has obtained advice on this matter from the foremost forest authorities in the United States, Scandinavia, and Canada, especially Nova Scotia. One view was consistently expressed: Nova Scotia's forests will soon be in a perilous condition. **The Commission therefore recommends that a silviculture programme, within the context of comprehensive management plans, and based upon scientific knowledge and professional experience, be established in Nova Scotia.**

Protection

Protection is an essential element of any forest management programme. The forest is comprised of diverse species, susceptible to many diseases, the depredations of insects and, to some extent, man, and the damage caused by competing vegetation. The major predator is the eastern spruce budworm, which is endemic in Nova Scotia. There is no known means of eradicating it, but its impact can be mitigated in that suitably treated trees can be preserved. This reality must be taken into account in the pursuit of a properly managed forest, for there is little point in promoting the growth of trees, a process requiring forty or more years and heavy expenditures, if all can be lost in a matter of months or years where diseases or insects are involved, or minutes or hours as a result of human carelessness. In short, the maintenance of a healthy forest requires protection.

The impact of human negligence and error in recent years has been, for the most part, of minor significance in the context of the whole forest, although wanton damage, the irresponsible dumping of wastes, and the abandoning of automobiles are major nuisances, and should be discouraged. While those who thoughtlessly dispose of their garbage on forest land are subject to legal sanction, the Commission hopes that public relations programmes and education will eventually develop more responsible attitudes.

The potential loss to the forest on account of human negligence is greatest in the case of fire, and authorities report that over ninety-nine per cent of forest fires in Nova Scotia are caused by human agency. Again, educational services can do much to minimize the hazard of fire and its impact.

The province's fire record has been good, attributable to a very effective suppression system, and the Commission was impressed with the fire control arrangements and services at Shubenacadie. There has not been a major outbreak of fire since 1976, when about 20 200 ha (50 000 acres) were lost. The climatic conditions in the province do not, in general, create fire hazards, but April and May are the most critical months, before new growth has established itself on the forest floor.

The Commission has no recommendation to make regarding fire protection in the forest, recognizing that it is already well organized. While protection against fire is well in hand, there can be no room for complacency regarding other aspects of protection. Mortality reduces the potential harvest from Nova Scotia's forests by fifty per cent - for every harvestable tree that is logged, one dies. This situation could be substantially improved by the implementation of an effective and consistent programme of insect and disease control. Such a programme will now be discussed.

Chemicals in the Forest

The use of chemicals in the forests of Nova Scotia is a controversial issue. On one hand, advocates of the use of insecticides and herbicides argue that chemicals are essential components of any forest management programme which aims, without detriment to the environment, to provide a healthy forest for the future. On the other hand, there are those who believe that the use of chemicals degrades the environment, disturbs the balance of nature, and endangers the health of people directly or indirectly involved with forest activities. Some of these opponents have pursued litigation and have engaged in political lobbying with great commitment. They maintain that the use of pesticides in the forest should be discontinued until much more documentation is available.

The Commission has devoted a great deal of time to this issue, and has thoroughly examined the implications arising from the use of pesticides. A wide range of individuals and groups was consulted in Canada, the United States, the United Kingdom, Finland, Sweden, and West Germany. Particular effort was made to examine the concerns of Nova Scotians. The Commission has assessed all the views presented, and has concluded that it should confine itself to those aspects determinable on the basis of known technology.

The first priority was to examine the process whereby pesticides are registered and approved for use in Canadian forests. Before any pesticide may be used, it must satisfy the requirements of the Pest Control Products Act, a federal statute. Under the provisions of this Act, an elaborate programme of evaluation has been established to maintain what are internationally considered to be the highest standards of public health and safety in the world. The organization is comprised of representatives from the federal Departments of Health and Welfare, Agriculture, Fisheries and Oceans, and Environment (which includes the Canadian Forestry Service, the Canadian Wildlife Service, and the Environmental Protection Service), and it maintains contact with similar organizations in the United States, the United Kingdom, and Western Europe, as well as the World Health Organization.

There are three other principal Acts dealing with the use of pesticides in the forest. Environment Canada and Health and Welfare Canada jointly administer the Environmental Contaminants Act, which is concerned with environmental and human health hazards associated with pesticide use, and can be used when the Pest Control Products Act lacks adequate powers to deal with a source of environmental pollution. The Fisheries Act is administered by Fisheries and Oceans Canada. This Act prohibits the deposit of deleterious substances into water frequented by fish, and can be used to limit the use of pesticides demonstrably harmful to fish. Environment Canada also administers the Migratory Birds Convention Act, which is similar to the Fisheries Act in that it regulates the use of materials, including pesticides, in areas frequented by birds.

Some people believe that aerial spraying systems are intrinsically less safe than ground procedures. The Commission could find no substantiation for this belief, and had several opportunities to observe the high degree of accuracy that could be attained by operators using fixed wing and rotary aircraft in Canada, the United States, and Sweden. Within the bounds of reasonable foresight, the Commission is convinced that aerial spraying is safe, indeed safer than ground spraying.

The controversy over the use of chemicals in forestry has become so emotional that it is often forgotten how widespread the use of chemicals is in many aspects of modern society. One can hardly eat a meal, clean one's house, or use deodorants, to give but a few examples, without being exposed to chemicals. Believing that the emotionalism aroused by the issue of forest chemicals has distorted the facts, the Commission has gone to great lengths to examine a wide range of relevant information, on the basis of which a responsible and rational decision can be made. (See Appendix V.)

Herbicides

Herbicides are used to assist the establishment of softwood species by retarding the growth of competing vegetation. This vegetation deprives seedlings of light, moisture, and nutrients, provides cover for rodents who browse the stock and, to a lesser extent, damages softwoods when it is agitated by wind. Furthermore, herbicides can be used to reduce the fire hazard in selected areas, and to control weeds that are alternate hosts to insect vectors and plant diseases which attack softwoods. Herbicides have a specific impact upon vegetation, and are widely used in the agriculture industry and in domestic gardening, being often sold without restriction beyond the label instructions. There are over twenty proprietary preparations for forest herbicides, but only three major ones have been approved for field application in Canada.

There are many objections to the use of herbicides. It is alleged that: (1) herbicides are used to reduce or destroy hardwood species, which are worthy of preservation as they replenish the soil with vital nutrients; (2) the curtailment of deciduous growth causes coniferous monocultures believed to be detrimental; (3) herbicides have adverse effects on fish and other wildlife habitat, and on the environment; (4) herbicides constitute a public health hazard.

These objections will be answered in turn:

(1) The Commission is aware of the fact that herbicides will destroy a small number of hardwoods, but believes that this is of minor significance in the light of its recommendation as part of the Conservancy Policy that the hardwood resource be enhanced to almost double its current volume from 1 240 000 m^3 to 2 270 000 m^3 (600 000 to 1 100 000 cords). Like all silvicultural methods, the use of herbicides should be carried out locally but in the context of an over-all management plan. The doubling of hardwoods will be the result of numerous local, and seemingly unconnected, silvicultural activities. The effect, however, will be the replenishment of nutrients in the soil, the enlargement of the area and enhancement of the quality of habitat for wildlife who prefer this cover, the increase of possibilities for the extraction of fuel, sawlogs, and maple products, and the creation of a more aesthetically pleasing forest.

(2) The recommended management programme would not give rise to a monoculture in Nova Scotia. Deciduous species occur in most plantations, and are welcome additions to the site, once the plantation has been established.

(3) The Commission has become convinced that approved herbicides, when properly used, will have no adverse effect upon fish and other wildlife habitat.

(4) The possibility that toxic substances might cause distress or danger to humans must always be a paramount concern. The Commission examined this matter in the most intimate detail with health authorities in Canada, as well as seeking advice in the United States and Western Europe, and is convinced that, when properly used, registered chemicals will not endanger public health, wildlife, or the environment. Determining whether a material is safe to use is a technical exercise, whose terms are not easily understood by the layman, based as they are on complex scientific knowledge requiring the skills

of experts, including biologists, biochemists, physiologists, and toxicologists. The Commission is impressed with the competence of the individuals responsible for registration procedures in Canada, the rigorous standards established, and the care with which these are applied, and has complete confidence in the federal statutes governing the use of pesticides.

The Commission is convinced that registered herbicides, used according to label instructions, do not constitute a health hazard either to those directly involved, or to those who might inadvertently come into contact with them, and recommends that the use of federally registered herbicides be recognized as a necessary and safe tool in forestry.

There are strong advocates for the manual weeding of plantations. The Commission believes, however, that hardwood weeding by such means is not feasible in Nova Scotia, for the following reasons: it would be difficult, if not impossible, to assemble a labour force; the labour costs at current rates would be prohibitive; the process might have to be repeated several times before the softwoods were of sufficient height to survive on their own; and the procedure is hazardous. In contrast, weeding by the use of herbicides is safer, more effective, and can be carried out much more economically. Moreover, under the Conservancy Programme it is expected that over 3 000 people will be required to do silvicultural work, involving much more productive activities than manual weeding.

The Commission agrees with the belief that vegetation management - controlling or curtailing the growth of competing weed species - will enable a merchantable tree to be grown in forty to sixty years, as opposed to sixty to 100 years required under natural conditions. The maximum extent of the use of herbicides in Nova Scotia is expected to be under 12 100 ha (30 000 acres) in any one year, an area which is less than 0.3 per cent of the land in the province. Particular hectares are unlikely to require more than one or two treatments over a forty-year period.

Insecticides

The Commission believes that the establishment of an effective insect control programme is crucial to the maintenance of Nova Scotia's existing forest and the development of a superior forest. It received advice from the United States Forest Service, the Canadian Forestry Service, the administrators of the Pest Control Products Act in Ottawa, the Department of Health and Welfare, and the Nova Scotia Department of Health, among others. All these bodies were unanimous in the view that no material currently approved for use as an insecticide will cause distress or danger to the health of humans, wildlife, or the environment in general, if used according to label instructions.

As mentioned earlier, the spruce budworm is the most significant predator in the forests of Nova Scotia. In the larval stage of its development, the worm has a voracious appetite for the needle growth of coniferous species, particularly fir and spruce. Since these species represent eighty-six per cent of Nova Scotia's coniferous stands, the budworm is of critical significance. Infestations cannot be predicted with precision over the long term, but, by counting egg-mass deposits, the impact of the insect can be predicted up to ten months in advance. A viable forest can then be maintained by spraying the larvae with either a bacterial insecticide, which kills by inducing blood poisoning, or a chemical insecticide which kills the larva on contact.

NO PROPOSAL FOR THE FUTURE OF THE FORESTS IN THE PROVINCE COULD HAVE ANY VALIDITY WITHOUT AN EXPLICIT POLICY FOR DEALING WITH THE EASTERN SPRUCE BUDWORM. Past experience and the realities of budworm depredations must be recognized. These are as follows:

(a) budworm infestations have been recorded in Nova Scotia since 1846, and most probably occurred for centuries before that;

(b) the infestation can be extensive, and could have a catastrophic impact upon the forests in Nova Scotia;

(c) the only known way to preserve a living forest against budworm devastation is to kill the insect at a stage of its life cycle before it has devoured conifer needles;

(d) some silvicultural procedures, by improving the general health and strength of the forest, may mitigate the impact of the insect on particular stands, but silviculture in itself cannot provide protection;

(e) the budworm larva eats the needles of the majority of coniferous species found in Nova Scotia. Research has revealed an order of preference in the budworm's dietary habits - it prefers above all the flowers of spruce and fir, and it eats the needles of the following trees, in descending order of preference: balsam fir, white, red, hybrid red and black spruce, black spruce, eastern larch, white pine, and in the urban environment, Douglas fir and blue spruce. Contrary to some beliefs, no spruce species in the province is immune.

The Government of Canada has approved only those chemicals subjected to extensive testing, and demonstrating a high degree of safety. Two forms of insecticides have been approved for use to combat the spruce budworm in Canada's forests: bacterial insecticides, for example, **Bacillus thuringiensis** (B.t.), which kills the insect by causing stomach ulcers and inducing blood poisoning through the stomach wall, and synthetic chemicals such as fenitrothion and aminocarb, which kill the insect on contact by disorienting its nervous system.

While there is no appreciable difference in the relative safety of these materials when properly used, as far as humans are concerned, there are significant differences in effectiveness for controlling the impact of the insect. In the case of B.t., the material must be ingested by the insect in sufficient quantity, and timing is critical, as the insect must be prepared to feed. The synthetic chemicals need only come into contact with any part of the insect's anatomy. Experience has revealed that synthetic chemical procedures are simpler to operate and more effective. Inorganic or synthetic chemical insecticides have not been used for forestry in Nova Scotia in recent years, but are used regularly in New Brunswick, Newfoundland, Quebec, and in many of the American States, besides being widely used in agriculture throughout Canada and other parts of the world. One statement indicated that fenitrothion might be the most widely employed agricultural chemical in the world.

Much has been argued for and against the use of chemicals in the forest. Whatever the merits of the various materials or methods, the Commission is convinced that, if chemicals are used, the most important consideration must be whether such use could constitute a hazard to the health of those who might come in contact with the materials. In this regard, the Commission sees no ground for compromise. Proximity has no bearing upon this consideration. A material used under normal circumstances must be safe at zero metres. It is the Commission's understanding that all materials approved for use in Canada meet such a standard.

The Commission is also mindful of the advances achieved over the past generation in the development of insecticide materials and techniques, and expects that research will continue to yield improved methods and materials as well as better insight into the ways of controlling the negative impact of insects on the forest. Thus, in the matter of protection, no material or technique can be regarded as permanent. The recommendation which follows must be regarded as valid only until a better technique or material has been developed.

The Commission perceives no technical reason, either on the grounds of public safety or functional effectiveness, why bacterial insecticides should be preferred to synthetic chemical insecticides, and therefore recommends contingency planning to protect 400 000 ha (1 000 000 acres) of forest annually against insect depredations and, on the basis of benefit/risk principles, recommends the use of synthetic chemical insecticides sprayed by aerial means, either from fixed or rotary wing aircraft, subject only to operating within the rules and regulations prescribed by the federal authorities in Canada.

Chapter III

Forest Industry

There are 357 sawmills in the province, and five pulp and paper mills collectively produce newsprint, pulp, hardboard, wall panelling, door skins, pegboard, and packaging and moulded products such as egg cartons. Other forest-related industries, such as Christmas tree and maple syrup production, and commercial trapping for furs, are small, albeit important to their operators. The forest industry has not only been a continuing source of employment and incomes, but also has substantial potential for the development of additional jobs, facts which cannot be overemphasized to federal and provincial governments, and indeed to the industry itself.

Pulpwood Stumpage

Few of the submissions received stressed the need to grow and maintain trees as a primary consideration or expressed views as to the improvement of the tree stock. The Commission regards the development and maintenance of forest land in the province as critical to the future well-being of the biological, industrial, and social interests concerned. It also believes that the provision of an equitable reward to repay the efforts of woodlot owners is crucial to the future of Nova Scotia's forests.

At present, the financial return to privately-owned forest land appears to be negligible. The most a Nova Scotian woodlot owner can expect for stumpage is seven or eight dollars per cord, but, in many cases, the wood is sold at a roadside price, so that in the sale the value attributed to the fibre itself is almost nothing. This creates little, if any, incentive to the landowner to manage land for fibre production.

In Austria and Finland, landowners with small holdings under forty hectares (100 acres) are able to operate their woodlots in the expectation of generating a regular income flow, and figures of $10 000 to $15 000 per annum have been quoted. Included in this is the cost of extracting the wood. While circumstances in Nova Scotia are not always comparable, these data indicate what has been achieved by cultivating trees for quality. The most striking difference is in the base price paid for the raw material: a Finnish woodlot owner expects a stumpage reward of approximately eighteen dollars per cubic metre (forty dollars per cord). Quality plays a significant role. Of the production from these relatively small woodlots, only 30% goes directly to pulp processing; the remaining 70% is allocated to poles and pilings, veneers, and lumber products.

Land management involving expenditures of private money and effort makes little sense without the hope that such investment will ultimately be beneficial. In many instances, fibre is regarded as a fortuitous gift of nature, to be converted into cash as the opportunity arises, but unworthy of cultivation. The solution is to promote a forestry structure and accounting system which recognizes and values fibre, and which provides a reasonable basis for long-term investment.

Throughout the history of commercial forestry in the province, there has always been a surplus of pulpwood, either from forests in Nova Scotia or from other provinces serving the same markets. In the fluctuations of supply and demand, buyers have historically enjoyed an advantage but, in the final analysis, the price paid has afforded no return to the use of the factor land. It is for these reasons that the Commission believes the value of wood fibre, exclusive of costs, should be identified. Thereby, the contribution of land and the quality of fibre to wood processing can be recognized. Landholders will be afforded an opportunity to assess the merits of committing lands to the growing of better quality trees in general, and the management of stands for particular uses. **The Commission therefore recommends the establishment of a pricing structure for pulpwood, and all other primary forest products, exclusive of the cost of extraction and transportation.**

Even a modest increase in the present roadside pulp price of about forty-one dollars per cord would probably bring forth a deluge of material, at present curtailed by weak markets and the operating capacity of the mills. The attainment of a better price must necessarily await improved quality, stronger markets, and a more even balance between potential supply from the forest and requirements for raw material. The objective will only be expected following the implementation of the comprehensive management programmes outlined earlier.

Scaling

Scaling is the process of measuring wood to determine its volume and quality. In the past, this procedure varied considerably, influenced by local customs, different localities, and markets, so that the current variety of methods is extremely confusing for anyone unfamiliar with the process.

Effective measurement must be accurate and be seen to be accurate. The introduction of metric measurements has not always been readily accepted, and dealing in wood and wood products has been complicated by the use of measurements in units differing according to source, process, and market destination. This is unsatisfactory, and the application of a standard set of measurements in all aspects of forestry would make the system much more effective, facilitate the introduction of scientific techniques, enable more accurate comparisons to be made, and reduce errors in the transfer of technology. Forestry all over the world is moving towards the establishment of the International System of Units (SI), federal government administration and research is now committed to it, and children in Nova Scotia have been prepared in the use of the metric system for at least a decade.

The Metric Commission of Canada was established in 1970, and there have been policy recommendations since then, but public resistance has somewhat hindered implementation. The Canadian Standards Association has been considering the problems of scaling for some time, and published in 1977 an extensive document entitled "Scaling Roundwood", the first in a series of recommendations for the measurement of forestry products.

The Commission believes that the advantages to be gained by the establishment of a widely recognized measurement process far outweigh any inconveniences, and recommends that the standards outlined in the document "Scaling Roundwood" be implemented, and that the changeover to SI units be made as soon as possible. It further recommends that the Department of Lands and Forests organize a conference, with representatives from the pulp and paper mill, sawmill, and private woodlot owner segments, in which all would participate equally to determine when the entire forest industry, from a date certain, would convert to the use of SI units.

Sawmills

Established sawmills have a widespread geographical distribution throughout the province, and are often important sources of employment and income in rural communities where alternative opportunities may be scant. Sawmilling was the mainstay of forest workers in Nova Scotia from the time of the earliest settlements until the 1950s, by which time there were over 600 active sawmills. By 1983, that number had been reduced to 357, utilizing approximately 990 000 m^3 (450 000 cords) of sawlog quality material. Forty-four of these operations produce eighty-one per cent of the total output.

A number of circumstances have caused the reduction in the number of sawmills, including changes in capital requirements because of technical advances, deterioration of the quality and reduction of the quantity of sawlog material, and fewer market opportunities. Sawmillers in Nova Scotia sell about eighty per cent of their product on the local market, the balance being exported to traditional markets, mainly in the United Kingdom.

Continuing technological advances in the application of computer-controlled machinery and the uses of laser beams necessitates different scales and more refined skills. This technology is only applied when it can produce sawn products on a more competitive basis than by traditional techniques but, in the long run, it provides a more effective, better quality product, and safer conditions, and ensures improved income and job security. Industry in Nova Scotia should not attempt to delay the introduction of technical advances but should encourage it, in spite of the fact that such advances have always reduced the number of operations.

Increments of scale will need larger and more secure quantities of sawlog material, and the introduction of more sophisticated technologies normally requires better quality material. There is already evidence of difficulties in providing sawlogs to mills, and sawmillers, on occasion, are unable to meet orders for large-dimension stock. For these reasons, and others, a substantial import of sawn materials for the local market is taking place. The present forest cannot meet the potential requirement for sawmill products, and since there is an expectation that the inventory of high quality trees will decline over the coming two, if not three, decades, the immediate prospect is a reduction in the volume of lumber produced in the province.

It is for these reasons that the Commission concentrated its attention upon seeking an equitable solution to the problem of allocating the available sawlogs to the industry. In the expected context of scarcity, the hazard of arbitrariness or favouritism can only be avoided by open public marketing. **Accordingly, the Commission recommends the establishment of arrangements whereby those responsible for scheduling, allocation, and marketing make sawlog material available, in relation to the forest's capability, from all lands participating in the Conservancy Programme, and that a system of public auctions be introduced to determine, by an open bidding process, to which mills the material should be directed.**

Pulp and Paper Mills

Nova Scotia has five pulp and paper mills at present with capacities ranging from 176 000 m^3 (85 000 cords) of hardwood and 33 000 m^3 (15 000 cords) of softwood per annum, to 1 320 000 m^3 (600 000 cords) of softwood per annum for four of these mills, the potential aggregate softwood requirement being slightly over 2 640 000 m^3 (1 200 000 cords). The fifth mill has adapted its operations to the recycling of paper, and requires only a modest 13 200 m^3 to 22 000 ^{3} (6 000 to 10 000 cords) of softwood per annum. These are all highly capital-intensive operations and, with the exception of the smallest, very much dependent upon export markets for the disposal of their product.

Although pulpwood has been produced since the early part of this century, and processing has been carried out since the 1920s, it is only since the 1960s that industrial production of finished products, such as newsprint and kraft pulp, has imposed a substantial demand on the forests in the province. With sales of over $500 000 000 in 1982, this aspect of wood processing is of major significance for Nova Scotia, and has contributed greatly to employment and income opportunities.

These mills represent segments of long-standing business operations, well recognized and established on a world scale, and the international corporations were attracted to Nova Scotia in the expectation of having access to a secure, low cost supply of high quality fibre. The major operators have had such security underwritten by legislation.

The Commission is convinced that the commitment to supply these mills can be fulfilled, and that the forests in the province will eventually be able to support more industrial undertakings, if the Conservancy Policy is fully implemented. In the interim, a transition must be made from a gross over-supply of low quality pulpwood to the time when the forest inventory must be husbanded with extreme care to meet industrial requirements, after which an expanding quantity of higher quality raw material will become available. Industrial technology will, in all probability, continue to advance within this thirty to forty year period.

Such expectations require the development of a policy capable of adjusting to changing circumstances. The purchasing position of the pulpmills within their catchment areas has many of the attributes of monopsony, though all make purchases from locations in the central core of the province. Pulpmills have always had access to a surfeit of raw material, so that small woodlot owners have felt at a disadvantage in selling their pulpwood. This has resulted in the creation of associations to bargain for pulpwood prices and quotas. However, the bargaining powers are automatically constrained in a period of material surplus, especially when participation is not mandatory for all suppliers, and the companies maintain their own limits.

The participation of private woodlot owners in restoration, conservation, and improvement programmes will only be secured if the participants can expect an adequate reward for their efforts and sacrifices. An equitable reward for fibre ought to be provided. This would best be achieved if its value was seen to represent a reasonable proportion of the value of the final product. At present, the wood producer receives for standing fibre approximately one per cent of the final value of that wood as newsprint in New York - currently in the vicinity of $700.00 Canadian per tonne.

This, of course, will not solve the short-term over-supply problem, which might be improved by expanding current mill operations, developing new processing undertakings, or securing export outlets for the surplus material. As has been discussed, the Commission would prefer to see the surplus absorbed without resorting to the export of raw materials.

Markets

Markets are crucial to the future of forestry, as industrial activities cannot take place without them. At present, Nova Scotia is faced with an over-supply of mature and overmature fibre, and, in some areas, an insufficient quantity of immature fibre to take its place. This situation is the result of poor cutting practices in the past, and the emergence of too many even-aged stands after the impact of fire, insects, diseases, and wind, factors which, among others, have created such a surplus that it is hard for some to envision a time when fibre will be scarce. However, the Commission believes, on the basis of forest inventory information, that there will be a severe deficiency of high quality softwood fibre, beginning in the 1990s in eastern Nova Scotia. Government and industry are therefore faced with the dilemma of persuading those who are now deprived of adequate revenue because of the surfeit to prepare for future shortage. Nova Scotia's woodlots can provide fibre in the period of shortfall, and it is essential that private woodlot owners be motivated to create better woodlots and more fibre, thereby creating and maintaining jobs for themselves and for their fellow Nova Scotians.

Pulpmills require large volumes of fibre on a day-to-day basis, softwood of relatively high density being preferred, especially black and red spruce. Some pulping processes are more forgiving than others, allowing the use of poor quality fibre, including small proportions of hardwood, but the demand for pulp and paper containing hardwood is very limited. Hardwood species are less useful for industrial purposes, though higher density hardwoods are suitable as biomass for energy. The processing needs of sawmills are more specific, in terms of both quality and form, requiring good quality black and red spruce and, to some extent, pine and hemlock.

There is little evidence that competitive markets, in the accepted sense, exist for raw material, and the establishment of marketing boards and bargaining agencies reflects dissatisfaction with previous arrangements for the supply of raw material to processors. There has been no shortage of fibre, but this is unlikely to continue. The Commission believes that the present wood supply will not meet the long-term needs of the processing industry, and that the problem can be solved by instituting forest management programmes based on secure markets. Moreover, long-term projections, especially those made by the FAO, expect the North American demand for fibre to increase at an annual rate of 1.3 per cent to at least the year 2000. (**World Forest Products: Demand and Supply, 1990 and 2000,** FAO Publication No. 29, 1982). The forecasting branch is at present engaged in a detailed review of this publication and expects its findings to be published by late 1985 or early 1986. Consultations have been held with FAO officials, and they see no reason to refute the positive trend at present identified.

Indeed, all the FAO projections are positive, and the forecasters are convinced that there is a correlation between increases in disposable income and changes in the demand for wood products. While the expectation of income advances past the year 2000 is less optimistic, there is no apprehension that disposable incomes will decline in the developed world. The increasing worldwide demand for wood products is expected to continue well into the next century, in the developed world consistently, and as earnings allow in developing nations.

The matter of supply in the early part of the next century has been critically examined recently. The FAO Committee on Forestry, during its session in May 1984, expressed concern over the ability of the world's forests to satisfy the diverse demands expected in the next century. IF NOVA SCOTIA CAN GENERATE A SECURE SUPPLY OF HIGH QUALITY FIBRE PRODUCTS, IT HAS AN EXCELLENT PROSPECT THAT SUCH MATERIAL COULD BE SOLD ON WORLD MARKETS AT FAVOURABLE PRICES.

Although Nova Scotia represents less than three per cent of Canada's forestry trade, the province has distinct advantages of location, accessibility, and soil. The principal outlet for pulp and paper products has been the eastern seaboard of the United States, but the Nova Scotian proportion of this market is small. In addition, the province has traditional links with the United Kingdom, though this market has been compromised by the development of European Economic Community relations with Scandinavia. Any increase of disposable income in Central America, South America, and even Asia, would provide commercial opportunities for paper products. If the forests in the province can provide high quality fibre consistently to the pulpmills, these companies are sufficiently established to maintain markets for pulp and newsprint well into the future.

The market structures of the sawmilling industry are radically different from those of the pulp and paper industry, having more exacting raw material requirements and more competitive markets. Only twenty per cent of sawn products is exported, in contrast to well over ninety per cent of pulp and paper products. Moreover, the province is becoming increasingly dependent upon imports to satisfy its requirements for large-dimension stock. It is evident that the concentration process is already under way, which will mean a reduction in the number of mills, and that sawmillers will have to gear themselves to a new structure over the coming rotation. At present, two companies produce approximately twenty per cent of the sawlogs. The viability of small-scale seasonal sawmill operations catering to local markets is doubtful, although these are important sources of incomes. It must be recognized that Nova Scotia's contribution to the total market will always be small, and that the best basis for the successful marketing of its fibre, whether in the form of pulp, paper, or sawn products, will be superior quality, competitive prices, and reliability of delivery.

Christmas Trees

The growers of Christmas trees in the province are located predominantly on mainland Nova Scotia, Lunenburg County producing forty-five per cent of the total in 1983. Growers in Nova Scotia handle fifty per cent of Canadian Christmas tree exports, their main market being the United States. As far as numbers are concerned, Christmas tree growing reached a peak in the late

1950s; although the volume of trees sold has eased off somewhat, the value of the trees, at market destination, has consistently risen over the past decades, reaching $14 000 000 in 1983. The trees grown are mainly balsam fir, and the business employs 6 000 people, 5 000 part-time and 1 000 full-time. Owing to the seasonal nature of the occupation, those who regard themselves as full-time employees work for only six to ten months of the year.

Market opportunities are critical to the well-being of the business. The present premium on the U.S. dollar clearly facilitates sales in the United States, but in the final analysis, markets can only be sustained on the basis of a quality product. To this end, growers in Nova Scotia have moved towards the production of the premium sheared tree. The main competitors are growers in the United States, who produce plantation-grown Scotch pine (the largest seller in the United States), Douglas fir, and balsam fir. The artificial tree is also becoming an increasingly serious competitor.

The Christmas tree growers of Nova Scotia have requested that more research be directed to their industry, in particular that concerned with genetics, fertilization, seedlings, transport, herbicides, and disease and insect control. **The Commission recommends that research be devoted to these topics, and also to markets and quality control, and that better information systems be established to encourage people to respect the property of others. It further recommends that more assistance be provided through extension programmes.**

Maple Products

There are sixty-nine commercial producers of maple syrup in Nova Scotia, who cater to a small but steady market. In 1984, the total volume of syrup produced amounted to 78 200 litres (17 200 gallons), with an average selling price of $6.49 per litre ($29.50 per gallon), and the total worth of maple products at farm gate was $507 400.00.

The potential for maple syrup production is likely to increase, because much more silvicultural activity will take place in hardwood stands as part of the over-all management strategy of the Conservancy Programme. Maple stands which have potential for syrup production will be identified in all management plans, and owners will be encouraged to take advantage of the financial opportunities available.

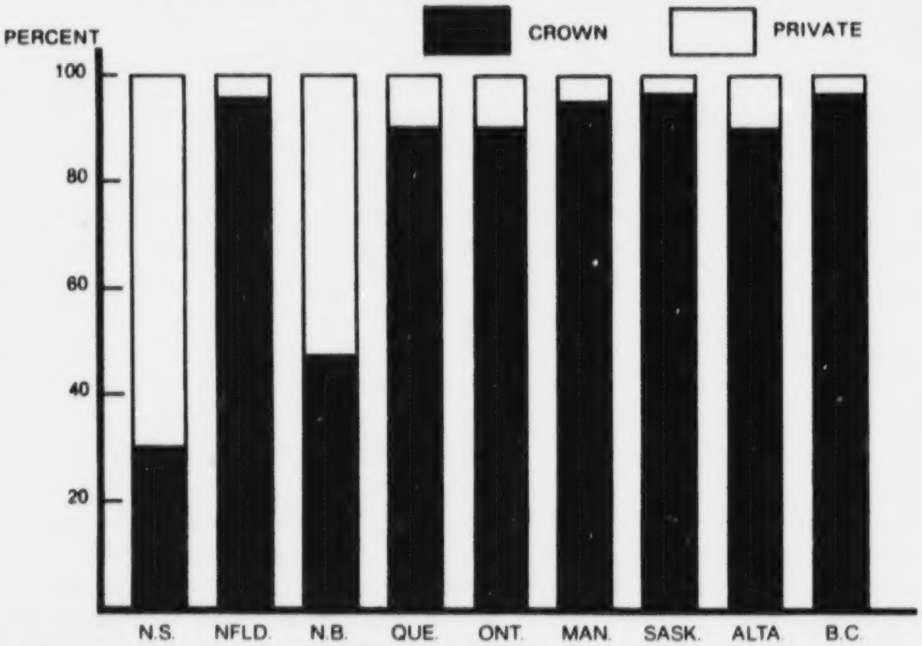
Market considerations for maple products are now within the purview of the Department of Agriculture and Marketing. **The Commission recommends that the current promotional and other assistance received from the Department of Agriculture and Marketing continue, and that the Deputy Minister of Forestry assume responsibility for improving tree quality and productivity.**

Chapter IV

Forest Land

Nova Scotia has a pattern of land ownership unique in Canada, seventy-three per cent of the 4 100 000 ha (10 200 000 acres) of forest land being held in the private domain. This pattern is more akin to that of New England or Finland than to most other Canadian provinces, where the Crown holds a major proportion of forest land. Crown holdings amount to only twenty-seven per cent of forest land in Nova Scotia, twenty-four per cent provincial and three per cent federal; fifty-two per cent is held by approximately 30 000 individuals in parcels averaging under eighty ha (200 acres), with a median holding of under forty ha (100 acres). The balance is distributed between corporations and large landowners.

FIGURE 9
CROWN vs. PRIVATE FOREST LAND IN CANADA



INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

Surveying

Forestry operations require accurate land measurement and identification of location, and a complete and accurate system of identifying properties would greatly assist land management programmes. The present knowledge of individual holdings is extremely variable, a situation mitigated somewhat by the fact that several provincial statutes now require a Nova Scotia land surveyor to certify the location of property boundaries for various types of development. Some landowners know the extent and position of their woodlots to a reasonable degree of accuracy, but many others are unsure of the location, size, and shape of their forested lands. The Nova Scotia Co-ordinate System is uncompleted, and a surveyor's act has been established but remains to be proclaimed. The proposal for land tenure reform by the Land Registration and Information Service (LRIS), initially sponsored jointly by the Federal and Provincial Governments, has faltered on the withdrawal of federal funding.

Survey programmes have been criticized for unwarranted expense, and foresters are sometimes irritated by what appears to be an unproductive administrative process. It is evident that the cost of present-day surveying has deterred many proprietors from becoming involved in forestry programmes when one of the first requirements is a boundary survey, and it is not unusual for the total fee for a woodlot survey to approach or exceed the commercial value of the property.

Technical advances have not lowered the costs of surveying. Although more sophisticated instruments allow the surveyor to make field measurements more quickly, this gain in efficiency is offset by the cost of additional crew and research time. Up to the 1960s, many landowners made their own arrangements for the cutting crew, thus reducing professional fees considerably. Since then, as land values and liabilities have increased, surveyors have assembled permanent crews skilled at measuring and cutting lines. Furthermore, there is nowadays considerable pressure on surveyors to carry out a thorough investigation of field evidence and written documentation, as inaccurate surveys could result in legal action being taken against them. Thoroughness takes time, thus increasing costs, and there are often substantial expenses occasioned by travel to locations. Notwithstanding these facts, the Commission believes that much would be achieved if the profession could devise a procedure for carrying out surveys at a more attractive cost.

The Commission recommends a two-part approach to the solution of survey problems in future forestry programmes, and that, first, an *ad hoc* agreement be negotiated when it is desirable to initiate a forest management plan and there is uncertainty with respect to location or ownership. This agreement would chart the land in relation to observable features or markers, identify the probable tenants, specify the silvicultural actions to be carried out, and provide for the distribution of any revenue from woods operations. There would be no recognition, explicit or implicit, of proprietorship, the *ad hoc* agreement existing solely for the purpose of allowing forest management to proceed.

Second, the Commission recommends that the Crown embark upon a programme to complete a detailed location survey of the forested land in the province, at a rate of two per cent per annum, and that the survey be permanently referenced to the Nova Scotia Co-ordinate System. It should be possible to resolve disputes by negotiated agreement but, if significant difficulties arise, the Commission further recommends that a land court be established to assess the merits of survey findings, and to render a binding decision with respect to title.

As pointed out above, the boundaries of many private woodlots in Nova Scotia are not known. In the resolution of boundary disputes, a survey is almost always necessary, in the case of both parties, and this deters many proprietors from attempting to resolve the dispute because of the expenses involved. In addition to surveying costs, expenses include solicitor's fees and court costs for a proper presentation to the Supreme Court of Nova Scotia, which has sole jurisdiction over the resolution of land title issues. Many private woodlot owners, therefore, cannot afford to resolve their differences.

In order for the Conservancy Programme to operate smoothly, means must be found to enable private woodlot owners to resolve their disputes at a price permitting them to take advantage of the opportunities offered. The *ad hoc* agreement will facilitate the operation of the Programme, but if boundary disputes are not resolved, survey-related problems will be even more accentuated when the forest crop is ready to be harvested.

The completion of a location survey for the province would require annual expenditures of approximately $5 000 000 at current rates for the identification and mapping of about 2 000 properties each year. Costs could be significantly lowered by working on blocks of land rather than piecemeal proprietorships, and by calling for tenders to survey and map the blocks. The tenders could then be compared to estimates provided by the Department of Lands and Forests. **If tenders from private surveyors indeed prove to be consistently higher than departmental estimates, the Commission recommends the establishment of a Land Services Agency, under the Deputy Minister of Lands, within which all the Provincial Government's land interests might be centralized, and the establishment of a Surveys Office within this Agency to carry out the location surveys.**

Land Use

The Commission perceives a land use policy to be the optimum use of land for the economic, social, and other benefits of the people of Nova Scotia. This policy has implications for forestry, agriculture, housing, industrial development, and recreation; indeed, it covers the whole range of social, economic, and political concerns. An explicit policy would greatly facilitate planning and development, whether of natural, industrial, or urban resources. The Nova Scotia Land Use Policy Committee has been considering this question for some time.

The need for certainty with respect to land use is particularly acute in forestry, since investments could require at least forty years to be fully realized. The restoration of the forest makes little sense without some security that trees planted will eventually be harvested, and the risk of any investment is increased if the future use of the land is undecided. **The Commission therefore strongly recommends that forestry lands be clearly indicated, and that ways be found to ensure that investments in the forest are realized to the benefit of the province and its people.**

Public Ownership

Land ownership has a critical bearing upon the development of the forest, especially as the pattern of ownership in Nova Scotia, detailed at the beginning of this chapter, is significantly different from that in other Canadian provinces. This difference obviously conditions government policies. The Crown's ability to assure industry of access to fibre on Crown lands has already been discussed, but whether such access could be better secured by extending or reducing Crown holdings is a critical issue. The fact that the Crown can exercise its own prerogatives without reference to another interest in determining the distribution of fibre would seem to make the expansion of Crown lands advantageous.

The holding of land carries with it the obligations of stewardship, including the restocking of the forest crop after harvesting, and the improvement of the land. The Crown has not always been seen to distinguish itself in these activities, but there is now a realization of the need to restore the forest.

It is desirable to seek means to acquire and manage forest lands to facilitate the implementation of the Conservancy Policy, and that the Government further identify the distinctive purposes for which it will acquire and hold lands, recognizing that forest husbandry requires a time-frame of at least forty years. The Crown has already identified purposes including the protection of watersheds, the maintenance of wildlife habitat, the development of industrial sites, the securing of land for recreational use, the protection of terrain of aesthetic merit, and the acquisition and consolidation of forest land with the hope of attracting and retaining industry.

The standard procedure adopted to date by the Department of Lands and Forests for the acquisition of land has been the attribution of a land valuation of sixty-two dollars per hectare (twenty-five dollars per acre), plus an evaluation for features such as access, fibre, proximity to watercourses, and opportunities for consolidation. The cost of site preparation, trees, and planting at current prices averages $830.00/ha ($335.00/acre), but since the general valuation of forest land acquired by the Crown seldom exceeds $250.00/ha ($100.00/acre), the land obtained is seen to be an excellent investment.

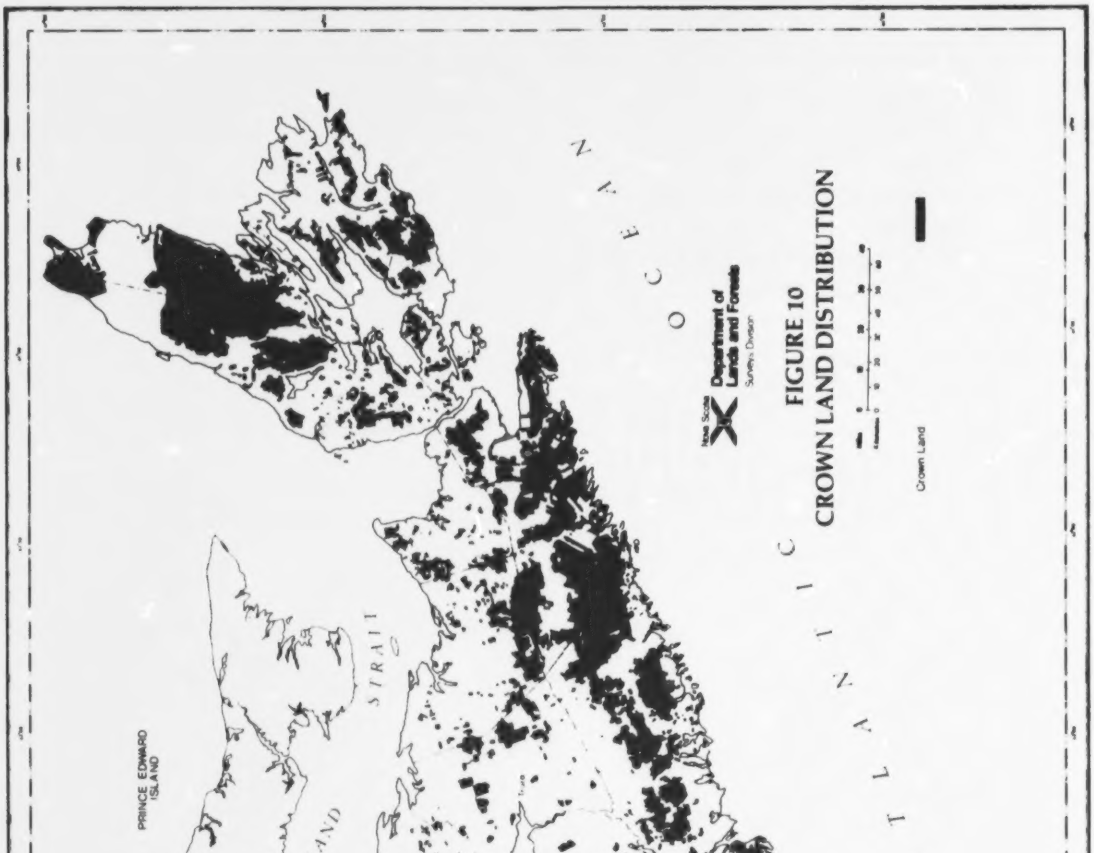


FIGURE 10
CROWN LAND DISTRIBUTION

Nova Scotia
Department of Lands and Forests
Surveys Division
Crown Land
PRINCE EDWARD ISLAND
NEW BRUNSWICK
NORTHUMBERLAND STRAIT
BAY OF FUNDY
ATLANTIC OCEAN

Financial provisions for land acquisition appear to have been assigned on a year-to-year, or even an *ad hoc* basis. Such an approach may have been appropriate in the past, but in the conditions expected during the coming rotation, greater certainty will be necessary, and critical decisions concerning the most advantageous use of funds will have to be made.

The Commission believes that the acquisition of further lands by the Crown will make a positive contribution to the Conservancy Programme, whenever the lands are in close proximity to present or expected processing points, or to blocks of existing holdings, or well-served by access roads. The land acquired should be of sufficient extent to allow for the economies of scale. The ultimate arbiter of decisions concerning acquisition should be land capability in relation to the Conservancy Policy. **The Commission therefore recommends the establishment of a definitive set of criteria for land acquisition and maintenance in relation to the Conservancy Policy, and the provision of funding on a long-term basis for acquisition programmes.**

Foreign Ownership

Foreign ownership is best spoken of in terms of non-resident proprietorship. It has been suggested that non-resident proprietorship might give rise to discretion detrimental to the provincial interest. The Commission has seen no evidence to substantiate this view, and believes that the origins or residency of titular proprietors of forest land are of less significance than how that land is husbanded in the pursuit of restoration, conservation, and improvement.

From the point of view of long-term forestry interests, the Commission believes that the provisions of the Conservancy Policy will rectify any anomaly perceived to exist in the present pattern of land ownership in Nova Scotia. It is of advantage, however, to know who owns land, and this will be discussed under the heading "Legislation, Leases, and License Agreements".

Ungranted Land

Ungranted land is land which has an ambiguous legal status, and therefore cannot be utilized to its full potential. The Crown's title is in question in the province on about 121 000 ha (300 000 acres) which were never granted but believed to be subject to possessory claims. The Limitation of Actions Act requires sixty years of adverse possession before the Crown's interest in land is extinguished. Common law has defined adverse possession as that which is open, continuous, exclusive, adverse, and actual.

The problems related to ungranted land result from the Crown's failure to establish the status of land over a century ago. The settling of claims is frequently an expensive and time-consuming process, often caused by neglect which allows difficulties to accumulate, and which gives rise to an uncertainty to title on the part of the tenant.

Insecurity of proprietorship can only have a negative effect upon forest renewal due to the uncertainty of the investments involved. It is therefore desirable to work towards the elimination of any impediment to the management of forest land, so that the programmes for restoration, conservation, and improvement can proceed. Staff in the Department of Lands and Forests have prepared a manual recommending various standards and procedures which appears to be a workable document and, having been adopted in one area, could be used in the whole province, if resources were to be allocated for this purpose.

Since the efficient management of forest land is very much dependent upon knowledge of the extent of ownership, and since the product of this land will be critical in the decades ahead, the Commission recommends that the Department of Lands and Forests assign sufficient technical and professional staff to research, document, and render decisions on the status of the 121 000 ha (300 000 acres) of ungranted land of questionable title by 1995.

Chapter V

Forest Amenities

Wildlife

Nova Scotia has abundant wildlife with a wide range of species, some available for commercial trapping, some providing recreational sport, and some simply offering aesthetic satisfaction by their very existence and visibility. In fact, it might well be argued that there are few locations in the world as close to major population concentrations which can still provide the chance to observe bald eagles, ospreys, ring-necked pheasants, several types of hawk, geese, ducks, coyotes, cormorants, weasels, black bears, and foxes, among others. Not all these species are indigenous to the province, but they have obviously found the habitat congenial. The Commission believes that the conservation of wildlife is of the utmost importance, and that it constitutes a major element in the makeup of the forest.

Concern was frequently expressed that modern forestry has a detrimental effect on wildlife. The Commission felt obliged to pursue the validity of these views, and to determine to what extent modern forestry might be incompatible with the preservation of wildlife or the improvement of its habitat. The advice obtained from wildlife biologists, government officials, and European foresters, was that intensive forest management, far from being incompatible with wildlife, favour it to such an extent that measures have to be taken to control the impact of animals on the forest, particularly at the early stages of growth. The Commission could find no substantiation for fears that wildlife would be harmed by the development of a new forest, and believes that wildlife management and the skills of the wildlife biologist ought to be an integral element in the over-all management of the forest. **Rather than establish firm regulations, the Commission recommends that the preservation of wildlife and the improvement of wildlife habitat be taken into consideration in the preparation of all forest management plans.**

Inventories of the various species of wildlife found in the forests of Nova Scotia apparently leave much to be desired, as many of the submissions could only offer speculative views on the matter, and little factual information. **As accurate measurement is fundamental to good research, the Commission recommends the establishment and maintenance of a sound inventory system**

upon which wildlife research programmes could be based, and which would become an essential component of forest management.

Populations of sport fish have generally shown a decline in the province over the past few decades. Nova Scotia has 118 rivers; 105 retain salmon runs in the 1980s, and only thirty are classified as good to excellent salmon rivers. This deterioration has stemmed from a number of causes, especially river pollution. There is no doubt that improperly conducted forest operations harm fish and the quality of river and lake water, but such damage is avoidable, and every forest management plan must recognize this.

The Commission examined the possibility that the use of forest chemicals might be detrimental to fish, and devoted considerable effort to obtain information about this matter. The procedure by which forestry chemicals are approved determines whether these substances cause any danger to fish. The Commission is satisfied that, used as prescribed, forest chemicals will have no appreciable impact on fish and will not harm their habitat. This issue has been discussed under the heading "Chemicals in the Forest".

The source of most atmospheric contamination, including acid rain, arises in political jurisdictions outside the purview of the Government of Nova Scotia. It is therefore a matter beyond the prerogatives of the Commission, which is very pleased to note that the Federal Government is making every effort to come to grips with this problem.

Hunting and fishing have been part of the way of life in Nova Scotia since the first settlements. The Commission examined, with concern, the matter of the safety of forest and agriculture workers during the hunting season. Legislation exists to deal with the problem but the need for due respect, care, and courtesy goes beyond the requirements of law, for only patient teaching and example can promote understanding of and respect for others. The Commission believes it desirable to promote safety in hunting, and commends the recently introduced Hunter Training Programme, although it would like to see more of these programmes available, involving practical experience to a greater extent than at present. A hunter training programme, for example, which does not include range experience is clearly deficient. The Commission has been advised that some of the firearms used in the province are poorly maintained and therefore dangerous, and believes that wildlife associations and gun clubs, which have contributed much to hunter safety, can play an even greater role in improving conditions in the province. The implementation of training programmes should not entail unreasonable expenses for hunters.

Concern was expressed that the consumption of alcohol causes shooting accidents during the hunting season. Accident records for the period 1978-83 reveal that there were 112 accidents, sixteen fatal, all of which were investigated by the Royal Canadian Mounted Police. (See Appendix VI.) Contrary to the widely held belief, none of these accidents involved alcohol, so that it is doubtful whether alcohol *per se* is a major contributor to hunting accidents in Nova Scotia. However, the use of alcoholic beverages while involved in hunting pursuits can only increase the risk of injury and possible death, so that any illegal use of alcohol in the woods is to be severely deprecated.

The Commission agrees with the view of the Hunting and Fishing Guides Association of Nova Scotia that the standard of guiding should be improved, and endorses the current efforts to establish a certification programme under the auspices of the Department of Lands and Forests, but questions the rationale of the legislation which requires non-resident hunters to hire a guide before entering the woods.

Trapping generates over $1 000 000 annually in Nova Scotia. Pelt sales are dependent upon market opportunities and current tastes, and can be curtailed by the activities of pressure groups. Representatives from the Trappers Association of Nova Scotia seemed satisfied with the circumstances of their business, although they did recommend the establishment of training programmes, especially those to encourage trappers to use traps and snares humanely. **The Commission recommends that these programmes be supported by the Department of Lands and Forests.**

Aesthetics

The value of the forest goes far beyond a dollar figure. The woodlands in the province have great variety and beauty, and constitute a priceless inheritance for every Nova Scotian. What child has not stood listening to the mysterious sound of the wind in the trees, a sound which varies with every species and with every season? What traveller has not enjoyed the patchwork of autumnal colour which drifts past on either side of the highway?

If one takes aesthetics to mean a pleasing appearance or effect, then it must be admitted that some bad forest practices, such as highgrading, can be aesthetically pleasing, while a good forest practice, such as the clearcutting of an overmature, even-aged stand, is often seen to produce ugliness, if not described in terms of rape and denudation. On the other hand, a clearcut with adequate regeneration is aesthetically pleasing, while a clearcut not regenerated or replanted is not only aesthetically displeasing but also the result of poor forest practices.

There are those who believe that any human activity or interference spoils the beauty of the landscape. But the sight of large areas of forest decaying as a result of the spruce budworm is hardly an attractive one, nor can much pleasure be taken in the sight of thousands of planted seedlings being smothered by competition. There is no virgin forest left in Nova Scotia; everything one sees has, for better or for worse, been modified by the presence of man. The Commission believes that the successful implementation of the Conservancy Policy would greatly enhance the beauty of the forests, especially in the autumn, as it has recommended that the volume of hardwood be doubled. While some silvicultural activities temporarily spoil the landscape, intelligent management should enhance the appearance and amenity value as well as the productivity of the forest in the long term.

Greenbelts

Greenbelts may be defined as: vegetation fringes left intact along a stream, river, lake, or highway, separating these from clearcuts or other developments. This is a complete assemblage of natural forest, and can include deciduous or coniferous trees or a combination of both.

There are widely differing opinions on the subject of greenbelts. Those who desire their maintenance argue that greenbelts moderate water temperatures by preserving shade along the edges of streams and lakes, nourish aquatic life by providing a habitat for insects, and reduce erosion by stabilizing the soil. Greenbelts also protect soils and watercourses by excluding machinery, and may also have the aesthetic advantage of screening forestry activities from the view of those travelling on the highways. This latter aspect has been cited as a contribution to the tourist trade.

In questioning the desirability of greenbelts, experienced foresters have pointed out the waste associated with failing to harvest mature timber, and the fact that overmature stands contain trees highly susceptible to decay, insects, and diseases. Furthermore, deprived of the shelter of adjacent standing timber, the greenbelt area is often unable to withstand wind, so that damaged trees ensue to the point of being unsightly. Broken trees can also fall into streams and lakes, possibly contaminating and obstructing the water.

The advocates of these opposing positions have become involved in protracted argument which has created a good deal of irritation. There is a body of literature and research on greenbelts, but it provides few conclusions or quantitative assessments of their benefits and costs. It is desirable to clarify the question whether greenbelts make a sufficient contribution to aesthetics and to wildlife habitat. The Commission recognizes the desirability of preserving fish habitat, either from extremes of temperature or contamination from erosion and sedimentation, but it is also aware of the economic loss if timber, ready to be harvested, is left standing.

There are approximately 11 000 kilometres (6 800 miles) of paved roads in the province. If a thirty-metre (100-foot) strip were left on either side of these roads, 66 000 ha (165 000 acres) theoretically supporting 4 400 000 m^3 (2 000 000 cords) of fibre would be removed from the forest inventory, a volume which would sustain the forest industry in the province for more than one year. The maintenance of greenbelts along the rivers of the province would exclude another 31 000 ha (77 000 acres) supporting 2 000 000 m^3 (924 400 cords). Lakes, streams, brooks, and gravel roads would, if included, aggregate to make the woodlands useless for industrial purposes, with the resultant loss of thousands of jobs.

The maintenance of greenbelts therefore depends, not simply upon their desirability, but upon the impact they make on the whole forest environment. This is something, however, which is very difficult to measure. Much more research needs to be done on features such as cover type, slope, and stream size to determine what form of protection would be appropriate in each case.

The Commission recommends the adoption of a forest management programme, within the Conservancy Policy, which would ensure the protection of fish and other wildlife habitat, water quality, and aesthetic values. Those directing the programme would be required to assess the particular circumstances of each stand, and to specify, in measurable terms, the best ways to provide protection, if indeed protection is necessary. Eligibility to receive the benefits of restoration, conservation, and improvement programmes would depend upon acceptance of these terms.

Parks and Recreation

The movement for the establishment of national parks has evolved since the end of the last century, and Nova Scotia, while a comparatively recent entrant into the process, has nevertheless dedicated a substantial area for parks and recreation. Parks Canada runs two national parks in Nova Scotia, containing a wide range of flora and fauna. The Federal Government has jurisdiction over these lands, which extend to 37 612 ha (93 100 acres) and 94 940 ha (235 000 acres) respectively, occupying 2.4 per cent of the total area of the province.

Present policies for the management of national parks stipulate that they should preserve and maintain the vegetation and wilderness structure without using artificial means. The vegetation stock of these parks is not managed for industrial purposes, although it contains important reservoirs of genetic material. However, there is concern that if the national park forests were to become diseased or infested with insects, they could contaminate stands beyond their boundaries. **In the light of this concern, the Commission recommends that Parks Canada take active measures to minimize the hazard of insect and disease contamination outside national park boundaries, and considers such planning in keeping with the adoption of a good neighbour policy.**

To date, 16 200 ha (40 000 acres) have been dedicated for provincial park and park reserve purposes, in addition to the federal parks mentioned above. The province maintains a network of ninety-nine operating parks, consisting of three types: picnic parks, beach parks, and campground parks. Eighty of these provide day-use opportunities and nineteen are campgrounds. The Commission is impressed with the present parks programmes run by the Department of Lands and Forests and Parks Canada, and believes the province to be, in many respects, amply and fortunately endowed for the needs of both residents and tourists, as it has an abundance of amenable locations for recreation in the countryside or on the shore.

Present patterns of land ownership and tenure, including that of non-residents, should not inhibit recreational activities. There may, however, be a shortage of suitable areas for those who wish to operate motorised recreational equipment such as snowmobiles, all-terrain cycles, and trail bikes, without detracting from the enjoyment of others. If interest in this form of recreation continues, the Department of Lands and Forests should see that appropriate areas are made available for its pursuit.

The Parks and Recreation Division of the Department of Lands and Forests believes that an additional 14 140 ha (35 000 acres) should be acquired in various parts of the province to bring Nova Scotia in line with a measure developed in the United States which assesses state parkland acreage in relation to population. The Commission believes that it would be a mistake to adopt this, as the population structures and geographical circumstances are very different in Nova Scotia from those found in most of the American States. Furthermore, approximately 500 000 Nova Scotians live outside urban concentrations, and have ready access to unspoiled countryside and shoreline.

Of the land held for park purposes by the Provincial Government, sixty per cent (9 700 ha; 24 000 acres) is still undeveloped, and, in one of the beach parks, the interpretative centre remains to be completed. The Commission is concerned that a bias towards the acquisition of lands for future park purposes may have developed to the detriment of providing amenities for people.

Thus, the Commission recommends, as a priority, the development and use of the present land holding, a targeting of parks services to meet the requirements and convenience of the provincial population and, finally, the acquisition of further lands for parks purposes only insofar as these readily lend themselves to rapid development or meeting immediate needs.

Chapter VI

Forests and Governments

Federal Government

Forestry has been an important industry in Canada since the earliest settlements, and has been a consistent generator of employment, incomes, and foreign exchange, valued in 1983 at twenty-eight billion dollars, from which taxation revenues of three billion were collected. Employing 1 000 000 people in Canada, directly or indirectly, forestry is clearly pre-eminent among the nation's economic and social resources, worthy of the most serious consideration, detailed research, and vigorous support.

In the past twenty years, the needs and interests of forestry appear to have been assigned a secondary role. At the federal level, forestry matters are the responsibility of the Canadian Forestry Service, which was a subset of the federal department, Environment Canada. Many would argue that the Canadian Forestry Service was not acknowledged as an equal among equals in this many-faceted department. There once was a Department of Forestry, but this was abolished, and concern has been expressed about the Federal Government's attitude to the forestry sector, although the signing of federal/provincial agreements, especially the Subsidiary Agreement for Forestry, and the Forest Resource Development Agreement, redresses the balance somewhat.

In spite of the fact that Canada has an enviable reputation for the richness of its resource, and the calibre of the people who have administered it, the ranks of the Canadian Forestry Service have been substantially reduced at a time when needs are greatest for research, changes in technology, methods, and relations with the community. As a result, forest professionals have experienced difficulties in having technical matters accepted at the political level, and publicly acknowledged.

It was repeatedly stressed to the Commission that, rather than further curtailment, the forest community will need much more support and skilled personnel, if it is to develop, and grasp the opportunities of future growth. The Commission needed no reminding of this fact; indeed, some of its own dealings with the federal forestry administration underlined the validity of such concern. The Commission is pleased to note the appointment of a Minister of State for Forestry, and the intention on the part of the federal government to establish a separate ministry, thereby recognizing forestry as a federal interest worthy of ministerial status. The Commission believes this will augur well for the future of the forestry resource in all provinces.

Legislation, Leases, and License Agreements

In an imperfect world, there will always be individuals or groups unwilling to co-operate with forest management programmes, so formal legislation will be necessary. Initially, legislation ought to be enabling, and subject to the minimum of sanction, and only in the last resort should participation in rehabilitation programmes be obligatory. The Commission believes, however, that the Conservancy Programme will be so attractive that there will be a ready willingness to co-operate.

Nineteen provincial statutes come within the purview of the Department of Lands and Forests, of which the most important is the Lands and Forests Act. This Act dates originally from 1926, and therefore its tenets were created in a social setting very different from that to be expected in the coming decades. **The Commission recommends that the Lands and Forests Act be replaced by new legislation enabling the implementation of all recommendations in this report, particularly those which will further the aims of the Conservancy Policy.**

The Land Holdings Disclosure Act is reported to be unworkable. With some modification, assessment records could be analyzed by computer, and up-to-date information about non-resident landholdings could be obtained by greater co-operation between the Department of Lands and Forests and the Department of Municipal Affairs. **As elsewhere indicated, the Commission believes that land use is of more importance to the people of Nova Scotia than the residency or origins of the titular owners, and, since it sees no use in legislating to the point of irritation, recommends that the Land Holdings Disclosure Act be repealed at the earliest opportunity.**

The Commission has considered the role played by the Forest Practices Improvement Board, and the implications of the Forest Improvement Act. This legislation was intended to promote the rehabilitation of the forest by providing guidelines for good forestry. In practice, however, a number of conflicts have arisen. The Commission neither desires nor intends to pass judgement on this matter, beyond regarding these conflicts as detrimental to confidence and the interests of forestry. Under the Conservancy Policy, the Deputy Minister of Forestry will be required to pursue the best use of available timber while maintaining environmental integrity, and the Inspector of Woods will be required to assist the accomplishment of these objectives by monitoring and public reference. In short, the prudences that were expected of the Forest Improvement Act will be embodied in the new Lands and Forests Act. **The Forest Improvement Act will therefore be redundant, and the Commission recommends that this Act be repealed at the earliest opportunity.**

The provisions of the unproclaimed Land Titles Act have been brought to the Commission's attention. It has reviewed these, and believes that they should be of considerable assistance in dealing with the problems of land tenure and the use of land for forestry. **The Commission therefore recommends the proclamation of this Act, and the implementation of its provisions for the registration of land.**

Three of the remaining fifteen acts - Bowaters Mersey Agreement Act 1962, Nova Scotia Pulp Limited Agreement Act 1958, Scott Maritimes Pulp Limited Agreement Act 1965 - were established to facilitate the Crown's provision of fibre to industry. A rigid adherence to the requirements of these Acts would compromise scheduling, allocation, and marketing programmes, as fibre will have to be allocated on a geographical basis because of insect devastation in eastern Nova Scotia. **The Commission therefore recommends that the Government enter into negotiation with the pulp companies, and that the separate agreements and acts be reviewed and amended, as necessary, to allow for the implementation of the Conservancy Programme to the mutual advantage of all interests.**

The Pulpwood Marketing Act (1972) established a Board to "register any association as the bargaining agent for all or any group or groups of producers or buyers of pulpwood", and to "investigate the cost of marketing, producing, distributing and transporting any pulpwood, prices, price spreads, trade practices, methods of financing, management, grading, policies and other matters relating to the marketing of pulpwood", and to perform certain other functions. To date, it appears that the Board has confined itself to the registration of bargaining agents.

The Commission has recommended that the Office of the Deputy Minister of Forestry assume responsibility for scheduling, allocation, and marketing. An intensification of silvicultural activities, with the aim of securing the future forest crop, will soon cause an increased flow of low grade fibre onto the market. But this market, in the early stages of the Conservancy Programme, will have a surplus of supplies as far as present and expected needs of the pulp industry are concerned. The Commission has, in consequence, envisaged a scheduling, allocation, and marketing strategy that might allow participants in the Conservancy Programme a guaranteed market, until there is more of a balance between supply and demand. Thereafter competitive markets, through an auction procedure, are expected to achieve an optimum regulation of supply and demand, as determined by price.

Scheduling, allocation, and marketing, as complementary procedures, are fundamental components of the process to rehabilitate the forest and improve the economic opportunities for private woodlot owners. The Nova Scotia Pulpwood Marketing Board, to the extent that it has pursued its mandate in practice, would have little, if any, direct impact on the actions envisaged under scheduling, allocation, and marketing programmes. It is difficult, however, to determine the precise role for the Board, or for bargaining agents, in the event of participation in the Conservancy Programme by a substantial number of woodlot owners.

Many of the functions related to marketing, distribution, and transportation, provided in the Pulpwood Marketing Act, but as yet not pursued, will have to be taken up by the Office of the Deputy Minister of Forestry, in order to secure a balanced forestry administration. Thus, there is a hazard of duplication or conflict between the potential activities of the Board and the organization monitoring scheduling, allocation, and marketing in the Office of the Deputy Minister of Forestry. **Accordingly, the Commission recommends that the Pulpwood Marketing Act be amended to restrict the Nova Scotia Pulpwood Marketing Board's activities exclusively to the registration of bargaining agents, and that the Minister responsible review this legislation to determine whether the Act ought to continue, once the Conservancy Policy has been adopted.**

The Minister of Lands and Forests is authorized, under the provisions of the Lands and Forests Act, Sections 37 and 79(a), to enter into agreements for land use and timber cutting, which involve campsite leases and access to cutting limits.

The policy concerning campsite leases appears to have been carried out on an *ad hoc* basis, and revenue from leases amounts to less than half the cost of administration. There are a number of non-legislated practices and procedures, for example, no new leases are now issued, and confirmation of a possession can only be obtained if it can be shown to have existed before 1971.

The Commission perceives these rules as inequitable as a situation now exists whereby approximately 400 residents of Nova Scotia are privileged to hold campsite leases on Crown land at an annual fee of twenty dollars. These leases are not available to any other individuals.

The best that can be said of the campsite lease policies and practices is that these are anomalous, and potentially embarrassing for government. **Accordingly, the Commission recommends that no new leases be issued and that, as the current leases expire, serious consideration be devoted to their termination. In the event of potential hardship where, for example, the leaseholder has made substantial improvements, the Commission further recommends disposal of the property on terms providing reasonable compensation for the improvement, and a fair return for the province's asset.**

Licenses to cut sawlogs are entered into with selected operators in the industry, and these are written mainly to cover a ten-year period in relation to a predetermined volume of products. As stated earlier, sawmills already find difficulties in obtaining sufficient suitable material, and the sawlog supply is unlikely to increase throughout the present rotation. **The Commission therefore recommends that all license agreements be terminated at the expiry of their present terms, as commitments to particular sawmills would be incompatible with the Deputy Minister of Forestry's responsibility for monitoring scheduling, allocation, and marketing programmes.**

Forest Finances

Estimating the dollar value of the forest resource in Nova Scotia is an elusive pursuit, and will probably never be otherwise. The volume of sales in fibre products was estimated at $500 000 000 in 1982. However, prices have been soft, and many operations have had to work below capacity so that, under optimum conditions, a value of over $600 000 000 would be more realistic.

Traditionally, the users of fibre have made little provision for silviculture, though efforts by the forest companies, and provisions contained in the Subsidiary Agreement for Forestry, and the Forest Resource Development Agreement have improved this situation. Nevertheless, the forest companies and the Crown have been the main participants in silvicultural programmes to date. Small woodlot owners have put only 225 000 ha (556 000 acres) under provincial forest management plans, representing about ten per cent of the privately-owned forested land in the province. The explanation of this situation is that, notwithstanding the government assistance available, most of the forest management assistance programmes require the owner to expend some personal resources, while the prospect of a significant return is remote in time.

As a result, what ought to be a resource generating a billion dollars annually, including explicit and implicit values such as lumber, newsprint, pulp, and tourism, has had little reinvested for restoration, conservation, and improvement. What reinvestment there is takes the form of silvicultural and development activities by forest corporations and government, and *ad hoc* forestry by individuals often assisted by government. THE COMMISSION REGARDS THIS AS IRRESPONSIBLE, BECAUSE IT BELIEVES THAT AT LEAST TEN PER CENT OF THE GROSS REVENUES GENERATED BY FINAL FOREST PRODUCTS SHOULD BE RETURNED FOR RESTORATION, CONSERVATION, AND IMPROVEMENT AS THE CONSERVANCY PROGRAMME EVOLVES.

The forest has been regarded as self-renewing, the return seldom justifying reinvestment for future use. But this belief has been refuted by the demonstration, particularly in Scandinavia but also in the southern United States and in New Zealand, that modern forestry can justify its investment costs by returns in the form of fibre, wildlife, soil conservation, recreation, and employment and incomes. This has come to be accepted in Canada during the last decade, with the introduction of the Subsidiary Agreement for Forestry 1977-82, under which $57 800 000 was spent in improving Nova Scotia's forests, and the current Forest Resource Development Agreement, under which $53 000 000 is being and will be spent on forest projects in the province from 1982 to 1987. In both these programmes, the costs have been and will be shared between Canada and Nova Scotia on an approximately fifty-fifty basis.

Although the Subsidiary Agreement on Forestry and the Forest Resource Development Agreement were and are indicative of a more positive attitude to renewing the resource, these have had an insufficient impact. The Commission has therefore concluded that it will be necessary to implement a forest redevelopment programme of such magnitude and attractiveness that the current trend of forest depletion is reversed towards one of restoration, conservation, and improvement.

In the fiscal year 1984-85, Nova Scotia will expend approximately $33 000 000 net of revenues and recoveries for all Lands and Forests purposes, including expenditure of $5 600 000 under the Forest Resource Development Agreement. The implementation of the Conservancy Policy ought to be launched at an expenditure level, in 1984 dollars, of $20 000 000 for the activities of scheduling, allocation, marketing, silviculture, and protection, as distinct from administration and planning within the office of the Deputy Minister of Forestry. Financing for some of the administrative costs of the Conservancy Programme should be available by reorganization within the Department of Lands and Forests.

Direct forest rehabilitation will require over $20 000 000 annually, and the Commission recommends that discussions be initiated at once with the Federal Government to have these expenditures underwritten to the extent of at least one-third, and that the Provincial Government be prepared to assume responsibility for an equivalent amount, providing an arrangement whereby the users of Nova Scotia's raw material make up the balance. Although this is an estimate of initial funding, both levels of government and industry should be aware of the necessity to maintain rehabilitation efforts in the long term, and be prepared to make sufficient financial provision, in keeping with the development requirements of the resource.

In order to improve forest land and maintain environmental quality, the Conservancy Policy should allow for programmes whereby:

> (a) the costs of developing, maintaining, and protecting all managed forests to required standards would be borne by the Crown and the processing industry;
>
> (b) all taxation levied upon forest land committed to restoration, conservation, and improvement would be abated;
>
> (c) a participant in management plans approved by the Deputy Minister of Forestry would be assured of a market for pulpwood and sawlog material at the current market price. This material should be sold exclusive of extraction and delivery costs.

Participation in the Conservancy Programme would necessitate:

(1) a commitment by the landholder to maintain the land in forest production and to manage it in conformity with approved practices;

(2) reimbursement to the Crown of financial assistance and tax relief in the event of failure to complete the management plan.

At present, the municipalities collect under $2 000 000 as the yield from commercial and non-commercial forest land assessment, at the rate of forty cents per acre and twenty-five cents per acre respectively. In addition, the Crown makes grants in proportion to the extent of Crown holding in each municipality on the basis of forty cents per acre for a gross grant of $1 275 000. The implementation of an abatement arrangement would require an adjustment of the provincial grant structure so that no municipality suffered a net loss of revenue due to the relief afforded to participants in the Conservancy Programme. The taxation policy recommended by the Commission has been discussed under the heading "The Solution".

Group Ventures

As has already been noted, more than half of the potentially most productive land in Nova Scotia is held by private individuals in parcels of less than eighty ha (200 acres). Modern forestry lends itself to the pursuit of the economies of scale, and, in an effort to avail of scale opportunities, the Subsidiary Agreement for Forestry (1977) provided special arrangements to encourage small landholders to form group ventures by pooling their efforts and resources. These provisions have been continued within the terms of the Forest Resource Development Agreement, so that, at the time of writing, there are fourteen ventures established throughout the province.

Broadly, the arrangement provides technical assistance and opportunities for the operation of large-scale capital equipment. Government assistance has underwritten 100 per cent of the costs of administration but, apart from this, the ventures have exercised complete autonomy over their operations. Their commercial activities, in common with all other forest producers, have been severely constrained by the weakness of demand over the last five years. Inasmuch as these organizations have brought together individual operators, and developed a sense of co-operation, their contributions have been positive, and it can only be regretted that difficult marketing conditions have frustrated their commercial viability in some respects.

Since it is obviously advantageous to combine land, equipment, and human resources, the Commission recommends that the activities of the groups be integrated within the scheduling, allocation, marketing, silviculture, and protection programmes, and that it be mandatory for the groups to have management plans in keeping with the requirements of the Conservancy Programme.

On the implementation of the Conservancy Policy, the groups will be eligible for assistance equal to that available to any other participant in the Programme, subject to satisfying obligations established by the Deputy

Minister of Forestry. It is probable that these groups, having experienced the benefits of co-operation, will become a central element in the rehabilitation of forests in the province.

Research and its Application

Forestry research in Canada is primarily a federal responsibility, and the Federal Government sponsors basic and applied research programmes. The application of research is of great significance for Nova Scotia, and the Deputy Minister of Forestry will have to ensure that knowledge of the latest techniques is available, and applied when likely to be beneficial. Relationships with federal research establishments have always been good, and the Provincial Government has co-operated with field experiments. Such support should be encouraged and increased.

Modern forestry should continuously take advantage of the results of research in the natural and applied sciences. Present and future demands on the forests in the province require, and will require, the identification and investigation of problems, and scientific rigour in field data collection and experiments, if the forest potential in all its aspects, is to be fully realized. The implementation of the Conservancy Policy will necessitate a considerable expansion of research, as a whole new set of information needs will emerge. The establishment of operational programmes must be based on professional knowledge, and those qualified must be guided by firm government objectives, thereafter being allowed to exercise professional discretion.

The Forest Research Section of the Department of Lands and Forests has developed and maintains a research programme, designed to serve the needs of both government and the private sector. Under this programme, projects are initiated to determine economical and ecologically sound means of increasing the productivity of the forests and reducing the costs of management. In addition, the research staff is responsible for the development of computer models to determine the costs and benefits of investment in forest management, providing information essential for the implementation of short and long-term policies.

There is a widely distributed network of universities in Nova Scotia, most of which have facilities for the sciences relevant to forestry. The Faculty of Forestry at the University of New Brunswick has recently expanded its research programme with a Chair of Forest Genetics, and the Atlantic Provinces Council on the Sciences (APICS) sets out, among other objectives, to promote co-operation between university, government, and industrial scientists in the Atlantic region, and to encourage the solution of problems in areas which require scientific research, including those connected with forestry.

The Commission believes that research is of critical importance to the success of any forestry programme, and recommends the establishment of a

research organization, directed by the Deputy Minister of Forestry, in which the Federal Government, the Provincial Government, academic institutions, and industry would participate jointly, and the appointment of a Research Officer, who would be responsible for research liaison, maintaining an awareness of developments, and seeking opportunities for applied research.

Employment

The implementation of the Conservancy Policy will require many trained, well-paid, reliable individuals, who must be capable of pursuing their art safely with sophisticated equipment. Much of the work is arduous, and must be done in extremes of heat and cold. The machinery used is very valuable, so that operators need training and continuous upgrading of skills, and must be encouraged to respect the equipment and understand its hazards, as carelessness or ignorance can be injurious or fatal, and can also damage the environment.

Some of the labour force will have to be mobile, given the long-term nature of forest rotation, and the tasks that have to be performed according to the ages of different stands. This factor is intensified by the devastation on much of Cape Breton Island, a situation which demands intense initial tasks, after which requirements will diminish, and labour resources will be needed in more westerly locations. It is probable that many new jobs will be filled by those under twenty-five, given the social dislocation caused by mobility.

The Commission recommends that further vocational training programmes be implemented, technical and vocational institutions in the province providing the bulk of the instruction, with industry participating in on-the-job training, and that the Deputy Minister of Forestry be responsible for these programmes, for ensuring that trained labour is available, that social amenities are provided near job locations, and that the work is sufficiently rewarded to give the woodsworker a worthy status within the community.

Public Awareness

It is voiced repeatedly that the public is in need of greater knowledge and understanding of forestry. The Commission was impressed with the appreciation and knowledge of forestry demonstrated in several European countries, and believes that the people of Nova Scotia would do well to emulate such examples.

Access to and use of forest lands have long been regarded in Nova Scotia as unquestioned rights. The principal piece of legislation governing the public's use of forest land is the Lands and Forests Act. There is no trespass act in the province, and efforts in 1983 to develop legislation concerned with such matters aroused some resentment. After a number of incidents involving theft, vandalism, and damage to property, the Act to Protect Property was created, but this Act imposes very limited restrictions. Minor transgressions will always occur, and can be curtailed to a large extent by better information services and public relations. The Commission is reluctant to advocate more stringent regulations governing access to forest lands in the province, when respect for forest amenities can be instilled by educational methods.

There is no evidence that the particular form of ownership - Crown in the right of Canada, Crown in the right of Nova Scotia, Corporation or private landowner - has given rise to differences in the granting of access. Landowners in Nova Scotia have, on the whole, been tolerant and accommodating to those who respect their property. However, certain landowners have restricted access in the light of incidents which they regarded as infringements of their rights. The public should understand that, ultimately, access to private property is a privilege, not a right, and carries with it the obligation to refrain from activities which might cause damage or disturbance. Notwithstanding the absence of a formal statute concerning trespass, those who abuse existing opportunities are subject to the laws of tort under common law.

In 1973, the Nova Scotia Section of the Canadian Institute of Forestry created a forestry awareness course for school teachers at the Nova Scotia Teachers College in Truro, and in 1979 set up a Forestry Education Task Force. This Task Force conducted a survey of 1 500 Grade Six students throughout the province, and a survey of teachers who had taken the forestry awareness course. The first survey revealed that Grade Six students were, in general, poorly informed about forestry; to improve this situation, a forestry kit was assembled, which is now available from Nova Scotia Museum outlets throughout the province. As a result of the teacher survey, a two-week methods course was developed to supplement the forestry awareness course, and to strengthen the teacher's confidence in the classroom.

In a brief submitted to the Commission, the Forestry Education Task Force indicated that, while these courses have proved to be successful, the major obstacle to promoting forestry awareness in schools lies in the structure of the educational system itself, and that it is unrealistic and unfair to expect already hard-pressed teachers to spend much time on forestry topics when the curriculum does not make sufficient allowance for such subjects. **The Commission concurs with the Forestry Education Task Force, and therefore recommends that the Department of Education take positive steps to create more awareness of the resource among teachers and students, that one or more units on forestry be included in the elementary and junior high school curriculum for science and social studies, that examples from forestry in Nova Scotia be included in senior high school science courses, and that knowledge of forestry be made an integral part of teacher training programmes.**

The Commission also recommends the following: the provision of additional forest information programmes in schools, with allowance made for different grades; the development of programmes to foster greater public awareness of the significance of the forest industry, and to deepen respect for

private forest property, wildlife, and forest resources; the preparation of speakers' programmes for service and social organizations; the provision of an advisory service for those directly involved in forest activities; and the creation of a press relations office to ensure that the media are accurately informed, and questioned in the event of misrepresentation. The Commission further recommends that the Deputy Minister of Forestry undertake the implementation of these programmes, be responsible for ensuring that such programmes are adequately funded, updated in the light of the latest research, and consistently pursued.

Chapter VII

Summary

The Commission has found that the present condition of the forests in Nova Scotia gives cause for extreme concern, and is convinced that decisive action is needed on the part of government to deal with the situation. Current management practices can only lead to an exhaustion of the resource within a generation, resulting in the loss of employment and incomes, and the recreational and social amenities that Nova Scotians have come to expect. The circumstances are of such severity and so obviously apparent that it would be irresponsible to pretend that there is no cause for alarm.

There are two main ways of responding to this peril. The consequences of the first - the *laissez-faire* and *status quo* approaches described earlier - would be an erosion of the resource, and such a deterioration of its qualities that, by the opening of the twenty-first century, the forests of Nova Scotia would bear only a sad reflection of former glory. The scene to be expected is of vast areas of cutover, juvenile trees, broken, diseased, and defoliated softwoods, and scorched landscapes resulting from fires. The Commission finds this prospect repugnant, since knowledge and means exist to create a healthier and more productive forest for generations to come.

The alternative response - the Conservancy Policy emphatically recommended by the Commission - would involve the restoration, conservation, and improvement of the woodlands in Nova Scotia by the application of the most up-to-date technology and scientific knowledge, with the aim of creating a forest secure, environmentally safe for all sectors of society, and economically viable for those dependent upon it for their livelihood. The Commission believes that the deterioration of the forest is the result of human choices, and is convinced that the Conservancy Policy is an attainable goal, given more positive choices.

The Conservancy Policy would be dependent upon the following:

(a) the adoption by the Governor in Council of an uncompromising policy to restore, conserve, and improve the forests in Nova Scotia by having legislation enacted;

(b) the professional expertise and funding to monitor and ensure the development of scheduling, allocation, marketing, silviculture, and protection programmes.

The Commission has estimated that, exclusive of administration, these programmes would cost $20 000 000 per annum, in 1984 terms, and has recommended that the costs of the programmes be shared on a tripartite basis between Canada, Nova Scotia, and industry.

The funds available would be expended:

(i) to schedule, allocate, and market the annual allowable cut. These procedures would involve determining which trees to cut, and to whom or to which organization fibre should be sent. It may be necessary to guarantee sales opportunities for harvests during the initial stages of the programme. Eventually, it ought to be possible to eliminate government direction and support, allowing free competitive market conditions to prevail, as demands approach an equality with supply or exceed potential supply.

(ii) to enhance naturally regenerated stands and plantation stock by silvicultural techniques and the application of the most up-to-date technology on up to 82 400 ha (204 000 acres) in any one year;

(iii) to protect the growing crop from the depredations of insects, the onset of diseases, and the negligence of humans. To embark upon the Conservancy Programme in Nova Scotia would require a contingency plan to protect not less than 400 000 ha (1 000 000 acres) annually against the eastern spruce budworm. In 1984, the minimum cost of this plan would be $5 000 000.

THESE FIVE ELEMENTS - SCHEDULING, ALLOCATION, MARKETING, SILVICULTURE, AND PROTECTION - ARE MUTUALLY INTERDEPENDENT. THE FAILURE TO IMPLEMENT ANY ONE WOULD JEOPARDIZE THE WHOLE CONSERVANCY PROGRAMME. Indeed, it must be stressed that, without these five elements, any forest management policy would be inoperable, and any expenditure wasted.

The Commission has recommended that a Deputy Minister of Forestry be appointed to oversee forest operations, and an Inspector of Woods to advise the Governor in Council as to the efficacy of government policies. While acknowledging that the Governor in Council must be responsible for the conduct of social affairs, the Commission has further recommended that government undertake a policy for the restoration, conservation, and improvement of the forests in the province, subject to public safety and the preservation of the environment. It is recognized that these aims will not be fulfilled quickly, and that evidence of success or failure may not be apparent within the lifetime of those who bear the initial burdens. The Conservancy Programme will entail a certain sacrifice on behalf of future beneficiaries.

The Commission believes that public health and safety must always be the primary responsibility of government, and that all forest programmes must be subject to the same priority. The direct involvement of government in strategic decisions and tactics for the Conservancy Programme ought to be of lesser significance, and the Governor in Council ought to be prepared to allow a measure of discretion to those responsible for the implementation of the Programme. Many things which have a bearing on the forest system are unpredictable - weather, insects, to say nothing of markets and human behaviour - and it is impractical to lay down hard and fast rules. There must necessarily be a contingency allowance, and flexibility in making arrangements. Moreover, strategic emphases will have to change with the passage of time, as the structure of the forest alters and the pattern of external markets varies.

Resources will have to be deployed in response to the most pressing need, without respect to previous commitments or intentions. There will never be sufficient financial resources for what could be done to improve the woods, which will provide a challenge to obtain the best returns from the provision made. Financial resources, technical skills, and manpower will be needed to be assembled to meet the demands of natural and social changes.

Participation on the part of private woodlot owners is crucial to the accomplishment of the forest's potential in Nova Scotia. Voluntary participation can be encouraged by:

(a) provision of more secure and equitable terms for the sale of fibre in small quantities. This will evolve out of scheduling, allocation, and marketing programmes, and the Deputy Minister of Forestry will determine when harvesting should take place, and will be committed to dispose of the fibre generated, at the prevailing market rate;

(b) relief from municipal taxation, and the underwriting on the part of government of the costs of silviculture and protection;

(c) commitment on the part of the landowner to fulfil and complete the obligations of the prescribed management plan;

(d) implementation of a resource land tax system. There will be an abatement, as per (b) above, of these taxes for landowners who elect to participate in the Conservancy Programme. Initially, this tax should be established at $2.50/ha, and be subject to adjustment on the advice of the Deputy Minister of Forestry, and the Deputy Minister of Lands, up to a level not to exceed one per cent of the Public Announced Price per tonne of standard 48.8 grams per square metre newsprint delivered in New York during the calendar year preceding the establishment of the tax level;

(e) development of a comprehensive forest extension service relating to all aspects of the forest system, and liaising effectively between government, industry, landowners, and the public.

The consequences of an effective policy to restore, conserve, and improve the forests in Nova Scotia will be:

(i) a substantial increase in the annual allowable cut of softwood and hardwood fibre, depending upon participation by private woodlot owners. The annual allowable cut of softwood could rise immediately from the present 3 300 000 m³ (1 500 000 cords) to 4 000 000 m³ (1 800 000 cords). Hardwood fibre production in the first ten years of the Programme could rise from an estimated 1 240 000 m³ (600 000 cords) per annum to about 1 900 000 m³ (900 000 cords) per annum. By the time a completely new forest has been established, the expected potential annual yield of softwood and hardwood fibre is at least 7 770 000 m³ (3 600 000 cords);

(ii) an expansion of market outlets, either to industry within the province or to export markets, necessitated by increments of fibre yield. The Commission would prefer to see new material used within the province as an employment base, either by established undertakings or by new enterprises. The demonstration of secure availability of high quality fibre ought to be attractive to potential industrial developers. Initially, there will be a geographical bias in the fibre increment, with early availabilities of pulpwood coming from western Nova Scotia. In contrast, the largest single raw material consumer is located on Cape Breton Island. The Deputy Minister of Forestry may have to participate in an organization to transport adequate supplies of raw material from west to east to secure eastern pulp and paper mill operations;

(iii) an increase in the total direct and indirect employment in forestry and related activities by 10 000 from 24 000 to 34 000 person years. This will require manpower preparation and training programmes in schools and vocational training institutions, and retraining facilities;

(iv) a substantial increase in all forms of wildlife. In fact, there could be such an abundance that some wildlife species could come to be regarded as pests, and hunting seasons may have to be extended, and bag limits increased. Hunting and recreational opportunities will be improved, and the tourist industry will find more opportunities to attract sportsmen if the season is extended.

The implementation of the Conservancy Policy will require substantial preparation, the assembling of suitable personnel, and the provision of adequate funds - $20 000 000 per annum will be required initially. During the transition period of three to five years, as the forest system is being reorganized, those dependent upon the woods for employment, or those who seek recreational facilities, cannot be expected to suspend their needs. All changes, therefore, will be made gradually over this period.

If the Governor in Council, having considered the report, decides to adopt the Conservancy Policy, the Commission envisages an implementation sequence as follows:

(a) the enactment of enabling legislation for scheduling, allocation, marketing, silviculture, and protection;

(b) the provision of funding to launch restoration, conservation, and improvement programmes;

(c) the establishment of an administration for the Conservancy Programme by the appointment of a Deputy Minister of Forestry, and redeployments, as necessary, within the Department of Lands and Forests, to create the Office of Deputy Minister of Forestry. As a corollary, the establishment of a Deputy Minister of Lands, to be responsible for the administration of all existing functions not assigned to the Office of the Deputy Minister of Forestry.

(d) the initiation, to the extent that current resources will allow, of restoration, conservation, and improvement programmes, especially silviculture and protection;

(e) the phasing out of existing programmes, with the aim of ending government commitments (some of these could be assumed, at the discretion of the Deputy Minister of Forestry, by the Conservancy Programme) to coincide with the termination of the present Forest Resource Development Agreement in 1987;

(f) the institution of comprehensive management strategies for the forests of Nova Scotia.

(g) the establishment of an Inspectorate of Woods to monitor all aspects of forest management within the province.

This report describes, in broad outline, the essentials of a policy - to be called the Conservancy Policy - for the restoration, conservation, and improvement of the forests in Nova Scotia. Within that Policy, there is substantial latitude for discretion and choice, provided fundamental obligations are honoured. The Commission sees no scope for compromise, however, concerning the obligations arising from the five technical aspects of management: scheduling, allocation, marketing, silviculture, and protection.

Recommendations

Chapter I
The Solution

The Commission strongly recommends that the Conservancy Option and the best elements of Options Four, Five, and Six be adopted and implemented as soon as possible.

The Commission recommends the following as requirements of the Conservancy Policy:

Establishment of manpower training programmes for potential silviculture workers;

Restructuring of agreements and acts with industry, especially those concerned with the management of the resource, for the benefit of all concerned;

Development of cost-sharing programmes and long-term agreements between the Federal and Provincial Governments and industry;

Increase of stumpage prices paid to the private woodlot owner and the Crown on the basis of quality;

Development of a modern system for the transport of pulp, sawlogs, and other forest products, either by road, rail, or sea, to minimize cross-hauling, and to ensure the distribution of sufficient fibre for industrial purposes, particularly during the period of shortage in the seven eastern counties;

Establishment of an Office of the Deputy Minister of Forestry within the Department of Lands and Forests, with the responsibility for restoring, conserving, and improving the resource, with appropriate professional and technical staff to guide the management of both private and Crown land by meeting the requirements of scheduling, allocation, marketing, silviculture, and protection;

Appointment of a Deputy Minister of Forestry, responsible for improving the quality and increasing the quantity of fibre, and for seeing that the forest is used, maintained, and improved in the light of contemporary social and economic circumstances. The Deputy Minister of Forestry will furthermore be required to establish and promote programmes of research and technical transfer, to inform and advise all sectors of society on the rationales, techniques, and economics of the industry, and also to ensure that sufficiently skilled personnel are available to carry out the mandate. As a corollary, it is recommended that a Deputy Minister of Lands be appointed to be responsible for the administration of all existing functions of the Department of Lands and Forests not assigned to the Office of the Deputy Minister of Forestry;

Establishment of an Inspectorate of Woods with responsibilities and powers analogous to the Auditor General's Office. This Office will be separate from the Department of Lands and Forests, and will serve as a monitor on all aspects of forest management within the purview of the Department;

Appointment of an Inspector of Woods who will report to the Legislature on the progress of the Conservancy Programme once a year, though the technical nature of the assessments best lend to a five-year time-scale, and this will be reflected in the form of reporting;

Development of a comprehensive forest extension service to disseminate technical information, to ensure that the fullest advice and assistance is made available to the public, to conduct practical technical sessions for woodlot owners, and to have management plans prepared and followed up with technical expertise regularly;

An approach be made to the University of New Brunswick, with a request to develop a specialized one-year programme leading to a Master of Forestry, designed to enhance the skills of those who desire to enter the extension field;

Preparation of management plans, consistent with the Conservancy Policy, to be entered into by private woodlot owners, which must include a commitment from the landowner, his heirs and assigns, to follow the plan to its completion. To repay the participating landowner for this commitment, the province will abate property taxes on the land concerned, provide silvicultural assistance in the form of cash payments, technical and professional expertise, and ensure the landowner a market for his product at the time of harvest. It is intended, by these means, to encourage landowners to commit their lands to forest management for the period of a full rotation. In addition, the province will monitor insect, disease, and fire hazard conditions in the forests and provide protection as required. Those who do not participate will be taxed as speculative landholders;

Consideration of opportunities for the use of an additional 2 200 000 m³ (1 000 000 cords) of softwood and a further 1 030 000 m³ (500 000 cords) of hardwood per annum that will become available in the course of the rotation. The expected annual volume of fibre available from 1985 to 2040 is as follows:

Year	Softwood (000's)		Hardwood (000's)		Total (000's)	
	m³	Cords	m³	Cords	m³	Cords
1985	3 960	1 800	1 860	900	5 820	2 700
1990	4 070	1 850	1 860	900	5 930	2 750
2020	4 620	2 100	1 960	950	6 580	3 050
2040	5 500	2 500	2 270	1 100	7 770	3 600

Since the pursuit of conflicting policies and procedures can only lead to confusion and inefficiency, the Commission recommends the phasing out of all forms of funding provided by government to autonomous organizations, and the redirection of these funds to the Office of the Deputy Minister of Forestry.

The Commission further recommends that lines of communication be established between autonomous organizations and the Inspectorate of Woods.

The Commission recommends that the Deputy Minister of Forestry be responsible for determining whether any proposed industrial development is compatible with the obligations and potential of the resource, before any government department or agency makes monies available.

The Commission recommends the establishment of fiscal measures to promote participation in the Conservancy Policy, and further recommends that the costs associated with management and administration be partially funded by raising the present levy on forest land initially to a standard tax of $2.50/hectare ($1.00/acre).

Chapter II

Scheduling, Allocation, and Marketing

Since effective scheduling, allocation, and marketing programmes must avail of up-to-date data processing techniques, the Commission recommends the establishment of a computer-based mapping system for all forested land in the province.

Silviculture

The Commission recommends that a silviculture programme, within the context of comprehensive management plans, and based upon scientific knowledge and professional experience, be established in Nova Scotia.

Herbicides

The Commission is convinced that registered herbicides, used according to label instructions, do not constitute a health hazard either to those directly involved, or to those who might inadvertently come into contact with them, and recommends that the use of federally registered herbicides be recognized as a necessary and safe tool in forestry.

Insecticides

The Commission perceives no technical reason, either on the grounds of public safety or functional effectiveness, why bacterial insecticides should be preferred to synthetic chemical insecticides, and therefore recommends contingency planning to protect 400 000 ha (1 000 000 acres) of forest annually against insect depredations and, on the basis of benefit/risk principles, recommends the use of synthetic chemical insecticides sprayed by aerial means, either from fixed or rotary wing aircraft, subject only to operating within the rules and regulations prescribed by the federal authorities in Canada.

Chapter III

Stumpage

The Commission recommends the establishment of a pricing structure for pulpwood, and all other primary forest products, exclusive of the cost of extraction and transportation.

Scaling

The Commission believes that the advantages to be gained by the establishment of a widely recognized measurement process far outweigh any inconveniences, and recommends that the standards outlined in the document "Scaling Roundwood" be implemented, and that the changeover to SI units be made as soon as possible. It further recommends that the Department of Lands and Forests organize a conference, with representatives from the pulp and paper mill, sawmill, and private woodlot owner segments, in which all would participate equally to determine when the entire forest industry, from a date certain, would convert to the use of SI units.

Sawmills

The Commission recommends the establishment of arrangements whereby those responsible for scheduling, allocation, and marketing make sawlog material available, in relation to the forest's capability, from all lands participating in the Conservancy Programme, and that a system of public auctions be introduced to determine, by an open bidding process, to which mills the material should be directed.

Christmas Trees

The Commission recommends that research be devoted to genetics, fertilization, seedlings, transport, herbicides, disease and insect control, and also to markets, and quality control, and that better information systems be established to encourage people to respect the property of others. It further recommends that more assistance be provided through extension programmes.

Maple Products

The Commission recommends that the current promotional and other assistance received from the Department of Agriculture and Marketing continue, and that the Deputy Minister of Forestry assume responsibility for improving tree quality and productivity.

Chapter IV

Surveying

The Commission recommends a two-part approach to the solution of survey problems in future forestry programmes, and that, first, an *ad hoc* agreement be negotiated when it is desirable to initiate a forest management plan and there is uncertainty with respect to location or ownership. This agreement would chart the land in relation to observable features or markers, identify the probable tenants, specify the silvicultural actions to be carried out, and provide for the distribution of any revenue from woods operations. There would be no recognition, explicit or implicit, of proprietorship, the *ad hoc* agreement existing solely for the purpose of allowing forest management to proceed.

The Commission also recommends that the Crown embark upon a programme to complete a detailed location survey of the forested land in the province, at a rate of two per cent per annum, and that the survey be permanently referenced to the Nova Scotia Co-ordinate System. It should be possible to resolve disputes by negotiated agreement but, if significant difficulties arise, the Commission further recommends that a land court be established to assess the merits of survey findings, and to render a binding decision with respect to title.

If tenders from private surveyors indeed prove to be consistently higher than departmental estimates, the Commission recommends the establishment of a Land Services Agency, under the Deputy Minister of Lands, within which all the Provincial Government's land interests might be centralized, and the establishment of a Surveys Office within the Land Services Agency to carry out the location surveys.

Land Use

The Commission strongly recommends that forestry lands be clearly indicated, and that ways be found to ensure that investments in the forest are realized to the benefit of the province and its people.

Public Ownership

The Commission recommends the establishment of a definitive set of criteria for land acquisition and maintenance in relation to the Conservancy Policy, and the provision of funding on a long-term basis for acquisition programmes.

Ungranted Land

Since the efficient management of forest land is very much dependent upon knowledge of the extent of ownership, and since the product of this land will be critical in the decades ahead, the Commission recommends that the Department of Lands and Forests assign sufficient technical and professional staff to research, document, and render decisions on the status of the 121 000 ha (300 000 acres) of ungranted land of questionable title by 1995.

Chapter V

Wildlife

Rather than establish firm regulations, the Commission recommends that the preservation of wildlife and the improvement of wildlife habitat be taken into consideration in the preparation of all forest management plans.

As accurate measurement is fundamental to good research, the Commission recommends the establishment and maintenance of a sound inventory system upon which wildlife research programmes could be based, and which would become an essential component of forest management.

The Commission recommends that training programmes, especially those to encourage trappers to use traps and snares humanely, be established, and further recommends that these programmes be supported by the Department of Lands and Forests.

Greenbelts

The Commission recommends the adoption of a forest management programme, within the Conservancy Policy, which would ensure the protection of fish and other wildlife habitat, water quality, and aesthetic values.

Parks and Recreation

The Commission recommends that Parks Canada take active measures to minimize the hazard of insect and disease contamination outside national park boundaries, and considers such planning in keeping with the adoption of a good neighbour policy.

The Commission recommends, as a priority, the development and use of the present land holding, a targeting of parks services to meet the requirements and convenience of the provincial population and, finally, the acquisition of further lands for parks purposes only insofar as these readily lend themselves to rapid development or meeting immediate needs.

Chapter VI

Legislation, Leases, and License Agreements

The Commission recommends that the Lands and Forests Act be replaced by new legislation enabling the implementation of all recommendations in this report, particularly those which will further the aims of the Conservancy Policy.

The Commission believes that land use is of more importance to the people of Nova Scotia than the residency or origins of the titular owners, and, since it sees no use in legislating to the point of irritation, recommends that the Land Holdings Disclosure Act be repealed at the earliest opportunity.

The Commission recommends the repeal of the Forest Improvement Act at the earliest opportunity.

The Commission recommends the proclamation of the Land Titles Act, and the implementation of its provisions for the registration of land.

The Commission recommends that the Government enter into negotiation with the pulp companies, and that the separate agreements and acts be reviewed and amended, as necessary, to allow for the implementation of the Conservancy Programme to the mutual advantage of all interests.

The Commission recommends that the Pulpwood Marketing Act be amended to restrict the Nova Scotia Pulpwood Marketing Board's activities exclusively to the registration of bargaining agents, and that the Minister responsible review this legislation to determine whether the Act ought to continue, once the Conservancy Policy has been adopted.

The Commission recommends that no new campsite leases be issued, and that, as the current leases expire, serious consideration be devoted to their termination. In the event of potential hardship where, for example, the leaseholder has made substantial improvements, the Commission recommends disposal of the property on terms providing reasonable compensation for the improvement, and a fair return for the province's asset.

The Commission also recommends that all license agreements be terminated at the expiry of their present terms, as commitments to particular sawmills would be incompatible with the Deputy Minister of Forestry's responsibility for monitoring, scheduling, allocation, and marketing programmes.

Forestry Finances

Direct forest rehabilitation will require over $20 000 000 annually, and the Commission recommends that discussions be initiated at once with the Federal Government to have these expenditures underwritten to the extent of at least one-third, and that the Provincial Government be prepared to assume responsibility for an equivalent amount, providing an arrangement whereby the users of Nova Scotia's raw material make up the balance.

Group Ventures

The Commission recommends that the activities of the groups be integrated within the scheduling, allocation, marketing, silviculture, and protection programmes, and that it be mandatory for the groups to have management plans in keeping with the requirements of the Conservancy Programme.

Research and its Application

The Commission believes that research is of critical importance to the success of any forestry programme, and recommends the establishment of a research organization, directed by the Deputy Minister of Forestry, in which the Federal Government, the Provincial Government, academic institutions, and industry would participate jointly, and the appointment of a Research Officer, who would be responsible for research liaison, maintaining an awareness of developments, and seeking opportunities for applied research.

Employment

The Commission recommends that further vocational training programmes be implemented, technical and vocational institutions in the province providing the bulk of the instruction, with industry participating in on-the-job training, and that the Deputy Minister of Forestry be responsible for these programmes, for ensuring that trained labour is available, that social amenities are provided near job locations, and that the work is sufficiently rewarded to give the woodsworker a worthy status within the community.

Public Awareness

The Commission concurs with the views of the Forestry Education Task Force and recommends that the Department of Education take positive steps to create more awareness of the resource among teachers and students, that one or more units on forestry be included in the elementary and junior high school curriculum for science and social studies, that examples from Nova Scotia forestry be included in senior high school science courses, and that knowledge of forestry be made an integral part of teacher training programmes.

The Commission also recommends the following: the provision of additional forest information programmes in schools, with allowance made for different grades; the development of programmes to foster greater public awareness of the significance of the forest industry, and to deepen respect for private forest property, wildlife, and forest resources; the preparation of speakers' programmes for service and social organizations; the provision of an advisory service for those directly involved in forest activities; and the creation of a press relations office to ensure that the media are accurately informed, and questioned in the event of misrepresentation. The Commission further recommends that the Deputy Minister of Forestry undertake the implementation of these programmes, and that the Deputy Minister of Forestry be responsible for ensuring that such programmes are adequately funded, updated in the light of the latest research, and consistently pursued.

Appendix I

Summary of Hearings

August 19, 1982
Halifax
Nova Scotia Woodlot Owners and Operators Association
Peter Sheen
Reginald Foley

October 8, 1982
Sydney
Framboise and Area Lobby against Spraying Herbicides
Lloyd Morrison
Robert G. Shaw
Peter Cumming
Shelleen Nelson
Donna F. MacQueen
Frank A. MacInnis

November 19, 1982
Antigonish
John MacDougall
Robert Cameron
John Haines
Gary J. Westenenk
John Westenenk

November 25, 1982
Halifax
Canadian Wildlife Federation
Nova Scotia Wildlife Federation
Nova Scotia Salmon Association
Christmas Tree Council of Nova Scotia
Nova Scotia Trappers Association
Hunting and Fishing Guides of Nova Scotia
Lands Resources Co-ordinating Committee - Voluntary Planning
Maritime Lumber Bureau
Masonite Canada Inc.

November 26, 1982 Halifax	Barrett Lumber Company Ltd. Forestry Sector Committee - Voluntary Planning Chamber of Mineral Resources of Nova Scotia Taylor's Silviculture Brothers Forestry
December 3, 1982 Truro	Nova Scotia Forest Products Association
December 10, 1982 Sydney	Cape Breton Co-operative Council Cape Breton Development Corporation Port Morien Wildlife Association
December 13, 1982 Baddeck	Woodsworld Association of Baddeck Nova Scotia Woodlot Owners and Operators Association, Victoria County Branch Victoria County Landowners Cape Breton Christmas Tree Association Baddeck Valley Woodproducers Co-operative Ltd. Cheticamp Board of Trade Geoffrey M. May Highland Pulp Ltd. Mac-Ing Construction Ltd. Mike Crimp
December 17, 1982 Halifax	Eastern Shore Development Commission Fisheries and Oceans Canada — Scotia-Fundy Region Nova Scotia Board of Examiners (Scaling) Neal Livingston Taylors Land Improvement Ltd. Douglas Taylor
January 11, 1983 Halifax	Garnet L. Hutchinson Chester Educational Foundation Garth DeMont Kingsley Brown Canadian Pulp and Paper Association

January 13, 1983 Shelburne (a.m.)	South Shore Environmental Protection Association, Shelburne/Yarmouth Chapter Leona Smith (presented by Anne Smith) Robert S. Smith
January 13, 1983 Bridgewater (p.m.)	Anthony Weagle Lunenburg County Christmas Tree Producers Association
January 18, 1983 Port Hawkesbury	Strait of Canso Industrial Development Authority Inverness-Victoria Medical Society, Herbicide Committee Gordon Cranton Town of Port Hawkesbury Nova Scotia Forest Industries Ltd.
January 20, 1983 Digby	Dr. William H. Thurlow Bear River Woodlands Ltd. Concerned Residents of Clare Committee E.M. Comeau & Sons (1977) Ltd. La Forêt Acadienne Ltée Forsite Ltd. Sissiboo Forest Management Ltd. Brian Coker
January 25, 1983 Truro	R. Barnhill Contracting Ltd. Nova Scotia Forest Technicians Association McCully and Soy Ltd. Maxwell Spicer North Nova Forest Owners Co-operative Ltd.
January 27, 1983 Halifax	Nova Scotia Department of the Environment Kell Antoft Wood Product Manufacturers Association of Nova Scotia Dr. Bruce J. Zobel Environmental Health Directorate, Health and Welfare Canada

January 28, 1983 Kentville	Annapolis Valley Affiliated Boards of Trade North Mountain Woodlands Ltd. Ginny Point
February 11, 1983 Halifax	Ecology Action Centre
March 4, 1983 Halifax	Elizabeth May Dr. Maxwell L. McCormack, Jr. Halifax Wildlife Association Canadian Nature Federation
March 8, 1983 Stellarton	Judith MacLennan West Pictou Forest Owners Ltd. Scott Johnston John Pettipas Scott Paper International, Inc., Canadian Timberlands Division
March 15, 1983 Port Hawkesbury	Highland Pulp Ltd. and Joseph A. LeBlanc Ltd. Port Hawkesbury Chamber of Commerce Atlantic Forestry Consultants Richmond County Municipal Council Nova Scotia Forest Industries Ltd.
March 17, 1983 Halifax	Canadian Institute of Forestry, Nova Scotia Section New Brunswick Forest Products Association Duncan MacAdams Canadian Paperworkers Union The Association of Nova Scotia Land Surveyors
March 22, 1983 Halifax	Dr. J. Ogden, III Nova Scotia Department of Health People for Environmental Protection

March 24, 1983 Truro	Environmental Protection in Cumberland South Women's Health Education Network, Environmental Committee Athol Cooperative Limited Allen Taylor
April 8, 1983 Liverpool	Bowater Mersey Paper Co. Ltd. Ralph Johnson IMA Aquatic Farming Ltd. Harry Freeman & Son, Ltd. Richard Freeman South Shore Environmental Protection Association, Queens/Lunenburg Chapter
April 14, 1983 Baddeck	Cape Breton Landowners Association Charles Restino
April 19, 1983 Halifax	Richard A. Lord Socialist Environmental Protection and Occupational Health Group Conform Ltd. Nova Scotia Forestry Association R.W.B. Douglas Recreation Association of Nova Scotia Dr. Robert Fournier
April 21, 1983 Halifax	Nova Scotia Forest Practices Improvement Board Canadian Agricultural Chemicals Association - Atlantic Provinces Council David H. Gaetz
April 22, 1983 Halifax	Canadian Society of Environmental Biologists and the Wildlife Society of Canada (Atlantic Chapters) The Medical Society of Nova Scotia Ledwidge Lumber Co. Ltd. Murray S. Prest

April 25, 1983 Halifax	Nova Scotia Department of Lands and Forests
April 26, 1983 Halifax	Nova Scotia Department of Lands and Forests
December 12, 1983 Halifax	Maple Producers Association of Nova Scotia Environment Canada
December 13, 1983 Halifax	Environment Canada

Appendix II

Submissions Received by Mail

Dennis Barnhill
Bras d'Or Institute, College of Cape Breton
Richard J. Brunt
R.L. Cotton
Cumberland County Home and School Association
Lorna Green
Mrs. Peggy Hope-Simpson
J.G. Janega
James F. Kennedy
C. Donald Knight
Ronald H. Loucks
Peter MacKay
Mrs. Donald MacLeod
Robert J. MacRury
Michael Marshall
C.B. Melvin
National and Provincial Parks Association of Canada
New Germany and District Public Education and Resource Group
Robert Peters
P.H. Petite
William K. Phillips
Wayne and Darlene Reaume
St. Mary's River Association
Town Council, Town of Canso

Appendix III

Terms of Reference

Deputy Minister of Forestry

Under the Conservancy Policy, the Deputy Minister of Forestry will be obliged to plan and implement policies and programmes for the restoration, conservation, and improvement of the forests in the province, by applying the provisions under the enabling legislation for scheduling, allocation, marketing, silviculture, and protection.

The Minister of Lands and Forests will be responsible for the estimates of the Office of Deputy Minister of Forestry in the Legislature. The Deputy Minister of Forestry will report to the Minister of Lands and Forests, and will have the rank and status of a Deputy Head.

The Deputy Minister of Forestry will be responsible for developing and implementing strategies to deal with the scheduling, allocation, marketing, silviculture, and protection of forest resources on all land ownerships for the optimum benefit of Nova Scotians, in keeping with present and future industrial demands, recreational opportunities, wildlife habitat, and environmental integrity.

In particular, the Deputy Minister of Forestry will be required to:

(a) implement policies and programmes, and recommend any necessary legislation for scheduling, allocation, marketing, silviculture and protection, in order to restore, conserve, and improve the forests in the province;

(b) gather, collate, and analyse biological and socio-economic data, as required, to develop a management strategy for the forest resources in the province;

(c) be advised of short and long-term industrial plans for plant investment, production capacity, end product, employment levels, expected sources of different species of wood, and ownership;

(d) establish criteria for harvest scheduling to optimize softwood and hardwood supplies;

(e) monitor the development of silvicultural techniques and harvesting equipment for use in the province, to assess potentials for productivity and environmental impact;

(f) advise on the development and negotiation of federal/provincial agreements related to forest resources.

Inspectorate of Woods

The Inspectorate of Woods will comprise an Inspector of Woods and a Board of Woods Inspection. The objective of the Inspectorate of Woods is to verify that the aims of the Conservancy Policy are being fulfilled. The Inspector of Woods will be responsible for carrying out the mandate of the Inspectorate, and will be an acknowledged professional forester.

The Board of Woods Inspection will act as an advisory body, meeting regularly with the Inspector of Woods, as well as being a channel through which any interested party may make representations, or comment on the conduct of the restoration, conservation, and improvement programmes.

The Inspector of Woods and the Board of Woods Inspection will be appointed by the Provincial Government under Orders in Council. The Inspector of Woods will submit routine reports of individual inspections to the Lands and Forests Committee of the Legislature, and an annual report to the Legislature. The principals involved will have an opportunity to examine and comment on a draft of the inspection report but, after sixty days, the reports will be made available to the public.

The Inspectorate of Woods will conduct inspections of forestry performance at randomly selected locations, to determine the degree to which silviculture has been carried out after harvesting, or after depletion by fire, insects, diseases, windfall, or other causes. Objective criteria of forest management will be established by legislation, with specific reference to scheduling, allocation, marketing, silviculture, protection, and related regulations. The Inspectorate of Woods may contract with professional foresters to conduct surveys or other field studies necessary for the documentation of an inspection.

The Board of Woods Inspection may hold public meetings in proximity to inspection areas to permit interested parties to discuss inspection reports, and to allow the public to be informed about restoration, conservation, and improvement programmes.

The budget for the Inspectorate of Woods will be accorded the same approvals and procedures as are required for public service votes now included in the Estimates, and approved by the Legislature. Funding will be sufficient to allow for an annual inspection of at least five per cent of the forested land under the management of the Deputy Minister of Forestry, or a greater area if requested by the Legislature.

Appendix IV

Partial List of Autonomous Organizations

Atlantic Foundation for Occupational and Environmental Health
Hunting and Fishing Guides of Nova Scotia
Maritime Lumber Bureau
New Brunswick Forest Products Association
Nova Scotia Christmas Tree Council
Nova Scotia Forest Products Association
Nova Scotia Forestry Association
Nova Scotia Guides Association
Nova Scotia Junior Guides School
Nova Scotia Wildlife Federation
Nova Scotia Woodlot Owners and Operators Association

Appendix V

Investigation of Pesticide Use

In the light of the widespread public controversy concerning the use of chemicals in the forests, the Commission went to considerable lengths to seek advice on the consequences arising from the use of insecticides and herbicides.

Advice to the Commission was presented as follows:

(a) lengthy briefings by members of the staff of (i) the Forest Pest Management Institute, the Canadian Forestry Service, (ii) the United States Forest Service, (iii) the United States Bureau of Land Management;

(b) submissions and discussions with staff from the Nova Scotia Department of Health; Environment Canada; the Environmental Health Directorate, Health and Welfare Canada; the Canadian Agricultural Chemicals Association; Nova Scotia Department of the Environment; Fisheries and Oceans Canada; The Medical Society of Nova Scotia; Agriculture Canada;

(c) field observations and discussions in Nova Scotia, New Brunswick, Quebec, Ontario, the state of Georgia, the state of Tennessee, the state of Alabama, the state of Oregon, the state of Maine, and Sweden, Scotland, and Finland, regarding spray use and methods of application;

(d) discussions with the federal Minister for Agriculture in West Germany, Georg Gallus; environmental interest groups in Nova Scotia, Ontario, and Oregon; Dr. Norman Moore, Nature Conservancy Council, Cambridge, England; Dr. T.W. Tinsley, Natural Environment Research Council, Oxford, England; Dr. Kilpatrick, University of Leicester, Leicester, England; Dr. Brunig, World Forestry Institute, Hamburg, Germany; and Dr. A. Jablanczy of British Columbia.

No one was able to identify a specific instance, that could be documented by clinical evidence, of any individual suffering detrimental health effects arising from the proper use of forest chemicals.

One person, however, made a presentation to the Commission to the effect that he believed he might have come into contact with a herbicide during the course of his employment during the 1960s. As a consequence of being in proximity to a material assumed to have been a herbicide, he suffered blurred vision, a loss of feeling in his toes and hands and, for a two-week period, was unable to walk unassisted, was unable to speak, and his sense of balance was lost. On being asked whether he would be prepared to authorize the Commission to have his clinical history reviewed, the witness said that extensive medical examinations had been unable to find any physiological explanation for his sickness.

As a result of its investigations, and especially in the absence of explicit clinical evidence to substantiate a direct link between the responsible use of forest chemicals and damage to human health or to the environment, the Commission has concluded that the proper use of these materials, as prescribed by regulatory agencies, does not constitute a hazard to public health or safety. The Commission is unaware of any reason why those who might inadvertently come into contact with approved forest chemicals should be under any fear or apprehension of physical distress.

Appendix VI

Summary of Hunting Accidents and Related Statistics

YEAR 1978

HUNTERS INVOLVED IN ACCIDENTS	
Killed	3
Injured	19
TOTAL	22

GAME BEING HUNTED			
Rabbits	8	Big Game	8
Birds	3	Non-Hunting	3

COVER TYPE	
Dense	8
Light	2
Open	12
Unknown	0

SELF-INFLICTED ACCID.	
TOTAL	8

LICENSED HUNTERS INVOLVED IN ACCIDENTS	
Licensed	11
Rabbits & Others (not required)	11

TYPE OF WEAPON INVOLVED			
Shotgun	7	Muzzle Loader	0
Rifle	8	Bow	0
22 Cal.	7		

TIME OF DAY ACCIDENT OCCURRED			
6:30-9:59 am	1	4:01-Dusk	6
10:00-4:00 pm	15		

CAUSES OF ACCIDENTS	
Victim Mistaken For Game	5
Unintentional Discharge	5
Defective Weapon	0
Victim Mistaken For Tree	1
Victim Moved in Line of Fire	3

AGE CLASS OF ACCIDENTS	Shooter	Victim
10-20	4	5
21-30	3	3
31-40	6	0
41-50	0	0
51-60	1	0

MUZZLE TO WOUND DISTANCE (YARDS)					
0-20	13	20-40	1	Over 41	8

CHARGES LAID AS RESULT OF ACCIDENTS	
Lands & Forests Act	2
Criminal Code	6
# Liquor Involved	0

YEAR 1979

COUNTY	INJURY HUNTING ACCIDENT	NON-HUNTING ACCIDENT	FATAL	TOTAL BY COUNTY
Anna.	1	0	0	1
Ant.	0	0	0	0
C.B.	2	0	0	2
Cumb.	2	1	1	4
Col.	0	1	1	2
Digby	1	0	1	2
Guy.	0	0	0	0
Hfx.	2	0	0	2
Hants	2	0	1	3
Inv.	0	0	0	0
Kings	3	0	0	3
Lun.	1	0	0	1
Pic.	3	0	0	3
Queens	0	0	0	0
Rich.	0	0	0	0
Shelb.	0	1	1	2
Vic.	0	0	1	1
Yar.	3	0	0	3
TOTAL	20	3	6	29

GAME BEING HUNTED

Moose	1	Furbearers	0
Deer	9	Bear	0
Rabbits	13	Unknown	0
Birds	3	Non-Hunting	3

TYPE OF WEAPON INVOLVED

Shotgun	14	Bow	0
Rifle	10	Muzzle Loader	0
22 Cal.	5		

CAUSES OF ACCIDENTS

Intentional Discharge	0	Unintentional Discharge	5
Victim Moved in Line of Fire	5	Shooter Stumbled and Fell	4
Victim Covered By Shooter Swinging On Game	0	Clubbing Cover or Game	0
Victim Out Of Sight Of Shooter	8	Trigger Caught On Object	0
Victim Mistaken For Game	6	Removing Weapon Or Placing in Vehicle	0
Weapon Fell From Insecure Place	0	Riding in Vehicle With Loaded Firearm	0
Crossing Fence Or Obstacle With Loaded Weapon	1	Horse Play With Firearm	0
Defective Weapon	0	Loading Weapon	0
Others	0	Unloading Weapon	0

* NO. LICENSES ISSUED YEAR 1978

Big Game	82,370	Estimated	
Small Game	40,198	Rabbit Hunters	31,343
Moose	600	Bear Trapping	455
Fishing	69,445	Furbearers	4,394
TOTAL	228,356		

COLOUR OF CLOTHING WORN BY VICTIM

Orange	1	White	0
Red	10	Dark	2
Green	0	Other	4
Blue	1	Unknown	11

TIME OF DAY ACCIDENT OCCURRED

6:30- 8:00 am	1	12-4 pm	12
8:00-10:00 am	2	4-5 pm	3
10:00-12 Noon	5	5 pm-Dusk	6

COVER TYPE

Dense	11
Light	7
Open	10
Unknown	1

VISIBILITY

Clear	21
Overcast	4
Poor	3
Dark	0
Unknown	1

VISION

Wears Glasses	2
Unknown	6
Colour Blind	0
Unknown	10

SELF-INFLICTED ACCID.

Fatal	1
Injury	7
TOTAL	8

* PROSECUTIONS YEAR 1978

Total Prosecutions	678
Jacking, Uncased Gun & Shining Light Prosecutions	123

AGE CLASS OF ACCIDENTS

	Shooter	Victim
10-15	2	2
16-20	7	5
21-25	4	4
26-30	2	0
31-35	1	2
36-40	6	2
41-45	0	2
46-50	4	1
51-	3	3

CHARGES LAID AS RESULT OF ACCIDENTS

Lands & Forests Act	1
Criminal Code	5
# Liquor Involved	0

MUZZLE TO WOUND DISTANCE (YARDS)

0-10	9	11-50	12	51-100	5
Over 100	2	Unknown	1		

* GAME TAKEN YEAR 1978

Deer	28,351	Geese	8,710
Bear	465	Grouse	96,980
Moose	182	Pheasant	11,110
Woodcock	10,158	Hun. Partridge	1,174
Snipe	4,740	Rabbits	641,370
Black Ducks	57,905	Furbearers	68,357
Sea Ducks	21,712	Trout	1,454,084
Other Ducks	37,600	Salmon	4,060

HUNTING EXPERIENCE OF SHOOTER

1 Year	6	4 Years	1	Over 5	2
2 Years	1	5 Years	0	Over 10	15
3 Years	2	Unknown	2		

* Licenses, Prosecutions & Game Taken are for previous year as present year's statistics are not available.

HUNTER SAFETY COURSES

First Time Firearm Hunters	6167
Other Firearm Hunters	3013
TOTAL	9180
Failures: Firearm	509
Bowhunters	330
Failures: Bowhunters	16

COURSE GRADUATES INVOLVED IN ACCIDENTS

Firearm Course	4
Bowhunter Course	0
TOTAL	4

Seasons & License Fees — 1979

DEER: October 15-November 30. One deer either sex except Yarmouth & Shelburne Counties — 1 Buck (Buck Law) November 22-November 30 either sex Yarmouth & Shelburne.

BEAR: Trapping — September 15-December 15. Hunting — October 15-November 30. Bag limit — none.

RABBITS: November 16-February 15 — use of 22 from December 1st only. Bag limit — none. No license required.

MOOSE: September 26-October 6 — Bag limit 1 either sex. 600 hunters by draw. 5 Counties of Province — Cumberland, Colchester, Pictou, Antigonish & Guysborough.

PHEASANT, HUNGARIAN PARTRIDGE, & GROUSE: Pheasant & Hungarian Partridge in Annapolis, Kings, Hants & Lunenburg — November 1 to December 15. Remainder of Province October 1 to December 15. Grouse — October 1 to December 15. Bag limits — pheasants — 2 cocks per day, after first day no more than 4 cock birds. Hungarian partridge & Grouse — 5 per day, no more than 10 after first day.

FURBEARERS: Mink, muskrat, otter, beaver — November 1-January 15, 1980. Fox, bobcat, weasel, red squirrel, coyote, skunk, fisher, raccoons — November 1-last day of February 1980.

Trappers: See summary for bag limits.

FISH & MIGRATORY BIRDS: Seasons & Bag limits regulated by Federal Gov't.

INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

YEAR 1980

COUNTY	INJURY HUNTING ACCIDENT	NON-HUNTING ACCIDENT	FATAL	TOTAL BY COUNTY
Anna.	1	0	1	2
Ant.	0	0	0	0
C.B.	4	0	0	4
Cumb.	0	0	0	0
Col.	1	0	0	1
Digby	0	0	0	0
Guy.	2	0	0	2
Hfx.	2	0	1	3
Hants	1	1	0	2
Inv.	1	0	0	1
Kings	0	0	0	0
Lun.	0	0	0	0
Pic.	0	0	0	0
Queens	0	0	0	0
Rich.	0	0	0	0
Shelb.	0	0	0	0
Vic.	1	0	0	1
Yar.	0	0	0	0
TOTAL	13	1	2	16

GAME BEING HUNTED

Moose	0	Furbearers	0
Deer	4	Bear	0
Rabbits	8	Unknown	0
Birds	3	Non-Hunting	1

TYPE OF WEAPON INVOLVED

Shotgun	9	Bow	0
Rifle	3	Muzzle Loader	0
22 Cal.	4		

CAUSES OF ACCIDENTS

Intentional Discharge	0	Unintentional Discharge	6
Victim Moved in Line of Fire	0	Shooter Stumbled and Fell	1
Victim Covered By Shooter Swinging On Game	0	Clubbing Cover or Game	0
Victim Out Of Sight Of Shooter	4	Trigger Caught On Object	2
Victim Mistaken For Game	2	Removing Weapon Or Placing in Vehicle	0
Weapon Fell From Insecure Place	0	Riding in Vehicle With Loaded Firearm	0
Crossing Fence Or Obstacle With Loaded Weapon	0	Horse Play With Firearm	0
Defective Weapon	1	Loading Weapon	0
Others	0	Unloading Weapon	0

* NO. LICENSES ISSUED YEAR 1979

Big Game	81.323	Estimated	
Small Game	34.324	Rabbit Hunters	32.010
Moose	600	Bear Trapping	674
Fishing	78.100	Furbearers	5.425
TOTAL	232.456		

COLOUR OF CLOTHING WORN BY VICTIM

Orange	0	White	0
Red	7	Dark	5
Green	0	Other	0
Blue	0	Unknown	4

TIME OF DAY ACCIDENT OCCURRED

6:30- 8:00 am	0	12-4 pm	7
8:00-10:00 am	2	4-5 pm	3
10:00-12 Noon	3	5 pm-Dusk	1

* PROSECUTIONS YEAR 1979

Total Prosecutions	599
Jacking, Uncased Gun & Shining Light Prosecutions	96

COVER TYPE

Dense	10
Light	3
Open	3
Unknown	0

VISIBILITY

Clear	11
Overcast	4
Poor	11
Dark	0
Unknown	0

VISION

Wears Glasses	1
Unknown	0
Colour Blind	0
Unknown	0

SELF-INFLICTED ACCID.

Fatal	0
Injury	8
TOTAL	8

* GAME TAKEN YEAR 1979

Deer	32.215	Geese	10.002
Bear	831	Grouse	77.378
Moose	182	Pheasant	11.490
Woodcock	5.823	Hun. Partridge	1.641
Snipe	3.478	Rabbits	532.184
Black Ducks	41.694	Furbearers	67.257
Sea Ducks	27.941	Trout	1.631.930
Other Ducks	26.256	Salmon	7.143

AGE CLASS OF ACCIDENTS

	Shooter	Victim
10-15	0	1
16-20	9	5
21-25	1	1
26-30	2	0
31-35	1	0
36-40	1	1
41-45	0	0
46-50	1	0
51-	1	0

CHARGES LAID AS RESULT OF ACCIDENTS

Lands & Forests Act	2
Criminal Code	3
# Liquor Involved	0

MUZZLE TO WOUND DISTANCE (YARDS)

0-10	10	11-50	5	51-100	0
Over 100	0	Unknown	1		

HUNTING EXPERIENCE OF SHOOTER

1 Year	5	4 Years	1	Over 5	1
2 Years	0	5 Years	1	Over 10	5
3 Years	2	Unknown	1		

* Licenses, Prosecutions & Game Taken are for previous year as present year's statistics are not available.

PREPARED BY: E. W. "CASEY" PENDERGAST

HUNTER SAFETY COURSES

First Time Firearm Hunters	4582
Other Firearm Hunters	2339
TOTAL	6921
Failures: Firearm	874
Bowhunters	187
Failures: Bowhunters	4

COURSE GRADUATES INVOLVED IN ACCIDENTS

Firearm Course	3
Bowhunter Course	0
TOTAL	3

Seasons & License Fees — 1980

DEER: November 1-November 30. All Counties. Bag limit — 1 of either sex.

BEAR: Trapping — September 15-December 15. Hunting — October 15-November 30. Bag limit — none.

RABBITS: November 16-February 15 — use of 22 from December 1st only. Bag limit — none. No license required.

MOOSE: October 15-October 25 — Bag limit 1 either sex. 660 hunters by draw. 7 Counties of Province — Cumberland, Colchester, Pictou, Antigonish, Guysborough, Inverness & Victoria.

PHEASANT, HUNGARIAN PARTRIDGE, & GROUSE: Pheasant & Hungarian Partridge in Annapolis, Kings, Hants, & Lunenburg — November 1 to December 15. Remainder of Province October 1 to December 15. Grouse — October 1 to December 15. Bag limits — pheasants — 2 cocks per day, after first day no more than 4 cock birds. Hungarian partridge & Grouse — 5 per day, no more than 10 after first day.

FURBEARERS: Mink, muskrat, otter, beaver — November 1-January 15, 1981. Fox, bobcat, weasel, red squirrel, coyote, skunk, fisher, raccoons — November 1-last day of February 1981.

Trappers: See summary for bag limits.

FISH & MIGRATORY BIRDS: Seasons and bag limits regulated by Federal Gov't.

INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

YEAR 1981

COUNTY	INJURY HUNTING ACCIDENT	NON-HUNTING ACCIDENT	FATAL	TOTAL BY COUNTY
Anna.	0	0	1	1
Ant.	0	0	0	0
C.B.	0	1	0	1
Cumb.	2	0	0	2
Col.	0	0	0	0
Digby	1	0	1	2
Guy.	2	0	0	2
Hfx.	1	0	0	1
Hants	1	0	0	1
Inv.	0	0	0	0
Kings	0	0	0	0
Lun.	0	0	0	0
Pic.	0	0	0	0
Queens	1	0	0	1
Rich.	0	0	0	0
Shelb.	1	0	1	2
Vic.	0	0	0	0
Yar.	0	0	0	0
TOTAL	9	1	3	13

GAME BEING HUNTED

Moose	0	Furbearers	0
Deer	7	Bear	0
Rabbits	5	Unknown	0
Birds	0	Non-Hunting	1

TYPE OF WEAPON INVOLVED

Shotgun	4	Muzzle Loader	0
Rifle	6	Bow	0
22 Cal.	3		

CAUSES OF ACCIDENTS

Shooter Stumbled & Fell	3	Victim Out of Sight of Shooter	0
Victim Mistaken For Game	2	Victim Moved In Line of Fire	0
Trigger Caught on Object	0	Weapon Fell From Insecure Place	0
Unintentional Discharge	4	Victim Covered By Shooter Swinging on Game	0
Horseplay With Firearm	0	Crossing Fence or Obstacle With Loaded Weapon	0
Clubbing Cover or Game	1	Removing Weapon or Placing in Vehicle	0
Intentional Discharge	2	Riding in Vehicle With Loaded Firearm	0
Unloading Weapon	0		
Defective Weapon	0		
Loading Weapon	0		
Others	1		

* NO. OF HUNTERS & FISHERMEN YEAR 1980

Big Game	73.262	Estimated Rabbit Hunters	23.928
Small Game	33.183	Bear Trapping	1.126
Moose	660	Furbearers	5.451
Fishing	82.629	Sr. Citizen Fishing estimate	5.000
Sr. Citizen Big & Small Game	8.539	TOTAL	233.778

COLOUR OF CLOTHING WORN BY VICTIM

White	0	Yellow	0
Red	5	Orange Fatal	1
Green	0	Orange Injury	0
Blue	0	Other	7
Dark	0		

TIME OF DAY ACCIDENT OCCURRED

6:30- 8:00 am	2	12-4 pm	2
8:00-10:00 am	2	4-5 pm	2
10:00-12 Noon	3	5 pm-Dusk	2

COVER TYPE

Dense	3
Light	4
Open	6
Unknown	0

VISIBILITY

Clear	9
Poor	0
Overcast	3
Dark	1
Unknown	0

VISION

Wears Glasses	1
Colour Blind	0
Unknown	0

SELF-INFLICTED ACCID.

Fatal	1
Injury	5
TOTAL	6

* PROSECUTIONS YEAR 1980

Total Prosecutions	529
Jacking, Uncased Gun & Shining Light Prosecutions	97
Warnings	605

* GAME TAKEN YEAR 1980

Deer	34.470	Grouse	76.274
Bear	863	Pheasant	13.278
Moose	209	Hun. Partridge	2.004
Woodcock	5.537	Rabbits	323.336
Snipe	2.471	Furbearers	74.979
Black Ducks	60.454	Trout	1.668.381
Sea Ducks	28.533	Salmon	8.331
Other Ducks	34.732	Geese	8.524

AGE CLASS OF ACCIDENTS

	Shooter	Victim
Unknown	1	
10-15		1
16-20	7	
21-25	1	1
26-30	1	2
31-35		
36-40		1
41-45		
46-50	2	
51-	1	2

CHARGES LAID AS RESULT OF ACCIDENTS

Lands & Forests Act	0
Criminal Code	3
# Liquor Involved	0

MUZZLE TO WOUND DISTANCE (YARDS)

0-10	7	11-50	2	51-100	3
Over 100		Unknown	1		

HUNTING EXPERIENCE OF SHOOTER

1 Year	1	4 Years	1	Over 5	0
2 Years	0	5 Years	2	Over 10	4
3 Years	2	Unknown	3		

* Licenses, Prosecutions & Game Taken are for previous year as present year's statistics are not available.
Senior citizens may obtain big & small game licenses free & do not require fishing licenses.

HUNTER SAFETY COURSES

First Time Firearm Hunters	6465
Other Firearm Hunters	5375
Bowhunters	194
TOTAL	12034
Failures: Firearm	1212
Bowhunter	0
TOTAL	1212

COURSE GRADUATES INVOLVED IN ACCIDENTS

Firearm Course	5
Bowhunter Course	0
TOTAL	5

Seasons & License Fees — 1981

DEER: November 1-November 30 All Counties Bag Limit — 1 of either sex. License Fees: Resident — $12.50; Non-Resident — $75.00; Resident Senior Citizen — Free.

BEAR: Trapping — September 15-December 15 Residents only — License Free. Hunting — November 1-December 30 License Fees: Resident $12.50; Non-Resident — $75.00.

RABBITS: November 16-February 15 — use of 22 from December 1st only. Bag Limit — None. No license required for residents. Small Game License for Non-Resident — $35.00.

MOOSE: October 1st-October 10th — Bag limit 1 either sex. Resident only. 440 hunters by draw. 7 Counties of Province — Cumberland, Colchester, Pictou, Antigonish, Guysborough, Inverness, Victoria. License fee $25.00.

PHEASANT, HUNGARIAN PARTRIDGE, & GROUSE: Pheasant & Hungarian Partridge in Annapolis, Kings, Hants & Lunenburg — November 1 to December 15. Remainder of Province October 1 to December 15. Grouse October 1 to December 15. Bag limits — pheasants — 2 cocks per day, after first day no more than 4 cock birds. Hungarian partridge & Grouse — 5 per day, no more than 10 after first day. License fees — Resident $9.00; Non-Resident $35.00; Resident Senior Citizen — Free.

FURBEARERS: Mink, muskrat, otter, beaver — November 1-January 15, 1982. Fox, bobcat, weasel, red squirrel, coyote, skunk, fisher, raccoons — November 1-last day of February 1982. Residents only, license fee $10.00. See Trappers Summary for bag limits.

FISH & MIGRATORY BIRDS: Regulations & Bag Limits controlled by Federal Government. Fishing License — Resident $3.00; Non-Resident $15.00. Federal Migratory Bird License $3.50.

INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

Summary of Accidents — 1981

1 (Injury) (Non-hunting) Three brothers went out to target practice. Sixteen year old brother handed 14 year old the gun which was loaded and same went off shooting 10 year old in foot. Occurred October 5, 12:45 P.M. (410 shotgun).

2 (Injury) Shooter shot victim in left arm. Mistaken for deer. Too dark — shooter charged under Criminal Code for dangerous use of firearm. Occurred November 2, 5:45 A.M. (rifle).

3 (Fatal) Victim mistaken for game (deer). Magisterial Enquiry to be held. Victim hit on cheek bone. Occurred November 4, 7:45 A.M. (rifle).

4 (Injury) Shooter mistook victim for deer injuring him in right thigh. Shooter charged for dangerous use of firearm. Occurred November 9, 8 A.M. (rifle).

5 (Injury) (Self-inflicted) Subject shot at deer, missed and was watching woods and accidentally pulled trigger wounding his big toe. Occurred November 9, 4:30 P.M. (rifle).

6 (Injury) Victim shot in chest by unknown deer hunter. Serious injury. Investigators unable to find out who shooter was. Occurred November 10, 4:15 P.M. (rifle).

7 (Fatal) (Self-inflicted) Subject was clubbing porcupine with butt of shotgun while hunting deer. Shotgun discharged and slug went into chest. Occurred November 13, 5 P.M. (shotgun slug).

8 (Fatal) Victim shot in left thigh. Bled to death before reaching hospital. Victim who was wearing Hunter Orange mistaken for game (deer). Shooter very negligent, charged and convicted for dangerous use of firearm. Occurred November 14, 5:20 P.M. (rifle).

9 (Injury) (Self-inflicted) Subject hunting rabbits, got caught in bushes, fell and the gun went off injuring middle toe. Occurred November 25, 10:30 A.M. (410 shotgun).

10 (Injury) (Self-inflicted) Subject hunting rabbits. States he accidentally removed safety and accidentally pulled trigger wounding small toe. Occurred November 27, 9:30 A.M. (20 ga. shotgun).

11 (Injury) (Self-inflicted) Subject checking rabbit snares carrying loaded rifle, tripped and fell. While on ground reached for rifle and trigger caught on branch, discharged injuring thigh. Occurred December 1, 1 P.M. (22 rifle).

12 (Injury)	(Self-inflicted) Victim hunting rabbits, stumbled and fell. Rifle discharged injuring left arm. Occurred December 10, 10:30 A.M. (22 rifle).
13 (Injury)	Shooter shot at rabbit and slug deflected off rock striking victim who was with him but not in line of fire. Wounded right thigh. Occurred December 16, 3:30 P.M. (22 rifle).

YEAR 1982

COUNTY	INJURY HUNTING ACCIDENT	NON-HUNTING ACCIDENT	FATAL	TOTAL BY COUNTY
Anna.	1	0	0	1
Ant.	1	0	0	1
C.B.	1	0	0	1
Cumb.	0	0	0	0
Col.	2	0	0	2
Digby	1	0	0	1
Guy.	3	0	0	3
Hfx.	1	1	0	2
Hants	0	0	0	0
Inv.	0	0	0	0
Kings	0	0	0	0
Lun.	0	0	0	0
Pic.	1	0	0	1
Queens	0	0	1	1
Rich.	0	0	0	0
Shelb.	0	0	0	0
Vic.	1	0	0	1
Yar.	0	0	0	0
TOTAL	12	1	1	14

* NO. OF HUNTERS & FISHERMEN YEAR 1981

Big Game	74.889	Estimated Rabbit Hunters	26.061
Small Game	34.791	Bear Trapping	979
Moose	440	Furbearers	5.541
Fishing	83.564	Sr. Citizen Fishing	5.000
Sr. Citizen Big & Small Game	8.994	TOTAL	231.265

* PROSECUTIONS YEAR 1981

Total Prosecutions	541
Jacking. Uncased Gun & Shining Light Prosecutions	132
Warnings	577

* GAME TAKEN YEAR 1981

Deer	39.558	Grouse	65.514
Bear	546	Pheasant	10.822
Moose	161	Hun. Partridge	1.071
Woodcock	3.360	Rabbits	379.862
Snipe	2.216	Furbearers	72.015
Black Ducks	41.711	Trout	1.540.365
Sea Ducks	20.608	Salmon	10.332
Other Ducks	8.403	Geese	3.693

* Licenses. Prosecutions & Game Taken are for previous year as present year's statistics are not available.

GAME BEING HUNTED

Moose	0	Furbearers	0
Deer	3	Bear	0
Rabbits	7	Unknown	0
Birds	3	Non-Hunting	1

TYPE OF WEAPON INVOLVED

Shotgun	7	Muzzle Loader	0
Rifle	4	Bow	0
22 Cal.	3		

CAUSES OF ACCIDENTS

Shooter Stumbled & Fell	2	Victim Out of Sight of Shooter	4
Victim Mistaken For Game	3	Victim Moved In Line of Fire	0
Trigger Caught on Object	0	Weapon Fell From Insecure Place	0
Unintentional Discharge	5	Victim Covered By Shooter Swinging on Game	0
Horseplay With Firearm	0	Crossing Fence or Obstacle With Loaded Weapon	0
Clubbing Cover or Game	0	Removing Weapon or Placing in Vehicle	0
Intentional Discharge	0	Riding in Vehicle With Loaded Firearm	0
Unloading Weapon	0		
Defective Weapon	0		
Loading Weapon	0		
Others	0		

COLOUR OF CLOTHING WORN BY VICTIM

White	0	Yellow	0
Red	2	Orange Fatal	1
Green	3	Orange Injury	2
Blue	0	Other	5
Dark	1		

TIME OF DAY ACCIDENT OCCURRED

6:30- 8:00 am	1	12-4 pm	3
8:00-10:00 am	2	4-5 pm	4
10:00-12 Noon	1	5 pm-Dusk	3

COVER TYPE

Dense	4
Light	6
Open	3
Unknown	0

VISIBILITY

Clear	6
Poor	1
Overcast	4
Dark	2
Unknown	0

VISION

Wears Glasses	1
Colour Blind	0
Unknown	0

SELF-INFLICTED ACCID.

Fatal	0
Injury	4
TOTAL	4

AGE CLASS OF ACCIDENTS

	Shooter	Victim
Unknown	0	0
10-15	2	1
16-20	1	3
21-25	1	1
26-30	3	2
31-35	2	0
36-40	2	0
41-45	0	0
46-50	1	0
51-	2	3

CHARGES LAID AS RESULT OF ACCIDENTS

Lands & Forests Act	5
Criminal Code	1
# Liquor Involved	0

MUZZLE TO WOUND DISTANCE (YARDS)

0-10	7	11-50	5	51-100	2
Over 100	0	Unknown	0		

HUNTING EXPERIENCE OF SHOOTER

1 Year	2	4 Years	0	Over 5	1
2 Years	0	5 Years	1	Over 10	7
3 Years	1	Unknown	2		

HUNTER SAFETY COURSES

First Time Firearm Hunters	6.148
Other Firearm Hunters	3.042
Bowhunters	224
TOTAL	9.414
Failures: Firearm	687
Bowhunters	0
TOTAL	687

COURSE GRADUATES INVOLVED IN ACCIDENTS

Firearm Course	4
Bowhunter Course	0
TOTAL	4

Seasons & License Fees — 1982

DEER: November 1-November 30. All Counties. Bag Limit — 1 of either sex. License Fees: Resident — $15.00; Non-Resident — $75.00. Resident Senior Citizen — Free.

BEAR: Trapping — September 15-December 15. Residents ONLY — License Free. Hunting — November 1-November 30 License Fees: Resident $15.00; Non-Resident $75.00.

RABBITS: November 16-February 15 (Use of 22 from December 1st only). Bag limit — none. No license required for residents. Small Game License for Non-Resident — $35.00.

MOOSE: No Moose Season 1982.

PHEASANT, HUNGARIAN PARTRIDGE, & GROUSE: Pheasant & Hungarian Partridge in Annapolis, Kings, Hants, & Lunenburg — November 1 to December 15. Remainder of Province October 1 to December 15. Grouse — October 1 to December 15. Bag limits — pheasants — 2 cocks per day, after first day no more than 4 cock birds. Hungarian partridge & Grouse — 5 per day, no more than 10 after first day. License fees — Resident $10.00; Non-Resident $35.00; Resident Senior Citizen — Free.

FURBEARERS: Mink, muskrat, otter, beaver — November 1-January 15, 1983. Fox, bobcat, weasel, red squirrel, skunk, fisher, raccoons — November 1-last day of February 1983. Residents ONLY. License fee $10.00. No snaring until December 15. See Trappers Summary for bag limits.

FISH & MIGRATORY BIRDS: Regulations & Bag Limits controlled by Federal Government. Fishing License — Resident $4.00; Non-Resident $15.00. Federal Migratory Bird License $3.50. Pr. Small Game License also required.

INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

Summary of Accidents — 1982

1 (Injury)	Shooter and victim hunting rabbits. The snow was being tossed in air by victim's feet and shooter thought it was a rabbit hopping and shot at same injuring victim's leg. Occurred — 4:30 P.M., January 2, 1982. (20 gauge shotgun)
2 (Injury)	(Self-inflicted) Subject hunting partridge in process of turning around and accidentally pulled trigger and shot himself in right foot. Occurred — 5:40 P.M., October 1, 1982. (410 shotgun)
3 (Injury)	Shooter mistook victim for deer. Charge laid under Criminal Code and Lands and Forests Act for causing bodily harm and hunting out of season. Occurred — 7:00 P.M., October 5, 1982. (22 ca. rifle)
4 (Fatal)	Shooter took sound shot at victim thinking noise was a Deer. Shooter took his own life following day. Occurred — 5:00 P.M., November 1, 1982. (30-06 rifle)
5 (Injury)	(Non-hunting Accident) Accident occurred at vehicle on road after day's hunting. Subject accidentally pulled trigger outside vehicle. Bullet went through door and struck steering wheel then struck driver. Shooter charged under Criminal Code. Occurred — 5:15 P.M., November 3, 1982. (30-30 rifle)
6 (Injury)	Victim hunting with 3 companions when struck by one of companions in leg. Occurred — 7:20 A.M., November 4, 1982. (rifle)
7 (Injury)	Shooter and victim hunting geese. Shooter was attempting to reload when gun went off striking victim in right leg. Occurred — 8:45 A.M., November 10, 1982. (shotgun)
8 (Injury)	Shooter saw movement and mistook victim for deer and shot him in thigh. Being charged under Criminal Code for dangerous handling of firearm. Occurred — 5:50 P.M., November 25, 1982. (303 Enfield rifle)
9 (Injury)	Subjects hunting rabbits, separated, saw rabbit go in thicket then saw movement and thought it was the rabbit, shot and hit victim in the neck and chest. Occurred — 3:00 P.M., November 26, 1982. (shotgun)
10 (Injury)	(Self-inflicted) Subject hunting rabbits in heavy bush and firearm got hung up in a bush, trigger caught on a branch, firearm discharged into his stomach area. Occurred — 11:40 A.M., December 14, 1982. (20 gauge shotgun)

11 (Injury) Victim hunting rabbits. Walking 30 feet ahead of shooter. Victim crouched down looking for tracks. Shooter stumbled and fell at same time and gun accidentally discharged striking victim on left side and stomach. Shooter charged under Criminal Code. Occurred — 2:00 P.M., December 23, 1982. (22 rifle)

12 (Injury) (Self-inflicted) Subject hunting rabbits, put muzzle of rifle on foot and unintentionally pulled trigger. Occurred — 4:15 P.M., December 21, 1982. (22 rifle)

13 (Injury) Subjects hunting rabbits. Shooter shot his companion who was wearing black hat with a white back. Shooter charged for dangerous use of firearm. Occurred — 4:00 P.M., December 28, 1982. (shotgun)

14 (Injury) (Self-inflicted) Victim hunting rabbits, stumbled and fell. Shotgun accidentally discharged injuring leg. Occurred — 9:00 A.M., December 31, 1982. (16 gauge shotgun)

Note: The victim who was killed was wearing hunter orange; however, the shooter took a "SOUND SHOT". The other two who were wearing Hunter Orange had self-inflicted their injuries.

YEAR 1983

COUNTY	INJURY HUNTING ACCIDENT	NON-HUNTING ACCIDENT	FATAL	TOTAL BY COUNTY
Anna.	2	0	0	2
Ant.	1	0	0	1
C.B.	1	1	0	2
Cumb.	1	0	0	1
Col.	1	0	0	1
Digby	0	1	0	1
Guy.	0	0	0	0
Hfx.	0	0	0	0
Hants	1	0	1	2
Inv.	1	0	0	1
Kings	1	0	0	1
Lun.	2	0	0	2
Pic.	1	0	0	1
Queens	0	0	0	0
Rich.	1	0	0	1
Shelb.	1	0	0	1
Vic.	0	0	0	0
Yar.	1	0	0	1
TOTAL	15	2	1	18

* NO. OF HUNTERS & FISHERMEN YEAR 1982

Big Game	73,546	Estimated Rabbit Hunters	28,463
Small Game	29,769	Bear Trapping	435
Moose	0	Furbearers	4,094
Fishing	79,809	Sr. Citizen Fishing	5,000
Sr. Citizen Big & Small Game	9,202	TOTAL	230,320

* PROSECUTIONS YEAR 1982

Total Prosecutions	606
Jacking, Uncased Gun & Shining Light Prosecutions	140
Warnings	825

* GAME TAKEN YEAR 1982

Deer	42,784	Grouse	83,331
Bear	435	Pheasant	10,126
Moose	0	Hun. Partridge	1,548
Woodcock	3,524	Rabbits	547,566
Snipe	2,868	Furbearers	65,968
Black Ducks	46,927	Trout	1,833,771
Sea Ducks	15,581	Salmon	6,572
Other Ducks	1,963	Geese	4,595

* Licenses, Prosecutions & Game Taken are for previous year as present year's statistics are not available.

GAME BEING HUNTED

Moose	0	Furbearers	0
Deer	6	Bear	0
Rabbits	7	Unknown	0
Birds	3	Non-Hunting	2

TYPE OF WEAPON INVOLVED

Shotgun	9	Muzzle Loader	0
Rifle	7	Bow	0
22 Cal.	2		

CAUSES OF ACCIDENTS

Shooter Stumbled & Fell	3	Victim Out Of Sight Of Shooter	3
Victim Mistaken For Game	1	Victim Moved In Line of Fire	2
Trigger Caught on Object	0	Weapon Fell From Insecure Place	1
Unintentional Discharge	0	Victim Covered By Shooter Swinging on Game	0
Horseplay With Firearm	0	Crossing Fence or Obstacle With Loaded Weapon	2
Clubbing Cover or Game	0	Removing Weapon or Placing in Vehicle	0
Intentional Discharge	0	Riding in Vehicle With Loaded Firearm	0
Unloading Weapon	2		
Defective Weapon	2		
Loading Weapon	0		
Richochet off Object	1		
Unknown	1		

COLOUR OF CLOTHING WORN BY VICTIM

White	1	Yellow	1
Red	0	Orange Fatal	1
Green	0	Orange Injury	10
Blue	1	Other	4
Dark	0		

TIME OF DAY ACCIDENT OCCURRED

6:30- 8:00 am	2	12-4 pm	6
8:00-10:00 am	3	4-5 pm	3
10:00-12 Noon	2	5 pm-Dusk	2

COVER TYPE

Dense	3
Light	4
Open	11
Unknown	0

VISIBILITY

Clear	16
Poor	0
Overcast	0
Dark	0
Unknown	0

VISION

Wears Glasses	1
Colour Blind	0
Unknown	0

SELF-INFLICTED ACCID.

Fatal	0
Injury	4
TOTAL	4

AGE CLASS OF ACCIDENTS

	Shooter	Victim
Unknown	1	0
10-15	1	1
16-20	3	3
21-25	4	6
26-30	3	1
31-35	2	0
36-40	1	0
41-45	1	2
46-50	1	0
51-	1	1

CHARGES LAID AS RESULT OF ACCIDENTS

Lands & Forests Act	1
Criminal Code	3
# Liquor Involved	0

MUZZLE TO WOUND DISTANCE (YARDS)

0-10	11	11-50	5	51-100	0
Over 100	1	Unknown	1		

HUNTING EXPERIENCE OF SHOOTER

1 Year	1	4 Years	1	Over 5	2
2 Years	1	5 Years	0	Over 10	9
3 Years	2	Unknown	2		

HUNTER SAFETY COURSES

First Time Firearm Hunters	6,789
Other Firearm Hunters	2,999
Bowhunters	271
TOTAL	10,059
Failures: Firearm	800
Bowhunter	0
TOTAL	800

COURSE GRADUATES INVOLVED IN ACCIDENTS

Firearm Course	5
Bowhunter Course	0
TOTAL	5

Seasons & License Fees — 1983

DEER: October 28-December 3. All Counties. Bag limit — 1 of either sex. License Fees: Resident — $15.00; Non-Resident — $75.00. Resident Senior Citizen — Free.

BEAR: Trapping — September 15-December 15. (Residents only — License Free). Hunting — November 1-November 30. (License Fees: Resident $15.00; Non-Resident $75.00).

RABBITS: November 16-February 15. (Use of 22 from December 5th only). Bag limit — none. No license required for residents. Small Game License for Non-Resident — $35.00.

MOOSE: No Moose Season 1983.

PHEASANT, HUNGARIAN PARTRIDGE, & GROUSE: Pheasant & Hungarian Partridge in Annapolis, Kings, Hants & Lunenburg — November 1 to December 15. Remainder of Province October 1 to December 15. Grouse — October 1 to December 15. Bag limits — pheasants — 2 cocks per day, after first day no more than 4 cock birds. Hungarian partridge & Grouse — 5 per day, no more than 10 after first day. License fees — Resident $10.00; Non-Resident $35.00; Resident Senior Citizen — Free.

FURBEARERS: Mink, muskrat, otter, beaver — November 1-January 15, 1984. Fox, bobcat, weasel, red squirrel, skunk, fisher, raccoons — November 1-last day of February 1984. Residents only. License fee $10.00. No snaring until December 15. See Trappers Summary for bag limits.

FISH & MIGRATORY BIRDS: Regulations & Bag Limits controlled by Federal Government. Pr. Salmon License — Res. $10.; N-Res. $15. Fishing License — Resident $4.00; Non-Resident $15.00. Federal Migratory Bird License $3.50. Pr. Small Game License also required.

INFORMATION COMPILED BY NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS

Summary of Accidents — 1983

1 (Injury) (Shotgun) Shooter 47 yrs. — 18 yrs. experience. Jan. 1, 5:15 P.M. Shooter and victim hunting rabbits. Shot at rabbit and pellets ricocheted and struck victim in legs and stomach area.

2 (Injury) (22 Rifle) Shooter 24 yrs. — 6 yrs. experience. Jan. 15, 4:00 P.M. Shooter and victim hunting rabbits. Shot at rabbit and bullet went through rabbit and hit victim in neck. Had course.

3 (Injury) (Self-inflicted) (22 Rifle) Shooter 19 yrs. — 3 yrs. experience. Jan. 17, 1:30 P.M. Shooter sighted rabbit, cocked weapon, moved to get clearer shot, tripped and shot himself in left foot. Clothing colour unknown but had no bearing as self-inflicted.

4 (Injury) (Shotgun) Shooter 30 yrs. — 14 yrs. experience. Jan. 22, 9:30 A.M. Shooter and victim hunting rabbits. Shooter careless in shooting too close to his companion and struck him in the back. Shooter charged for careless use of firearms — fined $200.00. Had course.

5 (Injury) (Shotgun) Shooter 30 yrs. — 19 yrs. experience. Oct. 3, 11 A.M. Shooter and victim hunting ducks. Victim was retrieving a duck 25′ away when shooter's firearm fell in boat and discharged accidently and one pellet lodged in victim's hand.

6 (Injury) (Shotgun) Shooter 25 yrs. — 4 yrs. experience. Oct. 5, 10:15 A.M. Shooter and victim hunting partridge. Shooter shot at partridge and pellets ricocheted off a rock back at victim.

7 (Fatal) (30-06 Rifle) Shooter 29 yrs. — 13 yrs. experience. Oct. 28, 7:00 P.M. Occurred first day of season. Shooter and victim not hunting companions, offical sunrise this date 7:47 A.M. Shooter hunting deer and shot victim for deer when it was quite dark. Shooter charged under C.C. for criminal negligence causing death.

8 (Injury) (38 Rifle) Shooter 63 yrs. — 25 yrs. experience. Oct. 28, 5:30 P.M. Shooter and victim hunting deer. Standing on a woods road with victim alongside of shooter on left. Shooter moved rifle from his right arm to his left arm and rifle discharged striking victim in the leg.

9 (Injury) (Non-Hunting) (Shotgun) Shooter 27 yrs. — 10 yrs. experience. Nov. 1, 4:45 P.M. Shooter standing by vehicle, loaded firearm and accidently pulled trigger and bullet hit a stone, ricocheted striking victim in left foot.

10 (Injury)	(303 Rifle) Shooter 30 yrs. — 17 yrs. experience. Nov. 10, 3:15 P.M. Shooter hunting deer and mistook victim for deer shooting victim in leg. Victim was shearing Christmas trees wearing white gloves and dark clothes. Shooter charged under C.C. for criminal negligence causing injury.
11 (Injury)	(Self-inflicted) (Shotgun) Shooter 17 yrs. — 2 yrs. experience. Nov. 10, 2:30 P.M. Shooter going uphill and fell and lost gun and when gun rolled down hill it went off striking him in the hand. Had course.
12 (Injury)	(32 Rifle) Shooter 37 yrs. — 22 yrs. experience. Nov. 11, 4:50 P.M. Shooter and victim (companion) returning home after day's deer hunt. Shooter slipped on log and rifle accidently discharged striking victim in the shoulder.
13 (Injury)	(Shotgun) Shooter 35 yrs. — 20 yrs. experience. Nov. 21, 7:30 A.M. Shooter and victim hunting rabbits, spotted rabbit, yelled to victim to ascertain his location, satisfied victim not in danger. Before shooter shot, victim moved and received pellets in both legs.
14 (Injury)	(30-30 Rifle) Shooter 21 yrs. — 3 yrs. experience. Nov. 22, 9:45 A.M. Shooter unloading rifle with muzzle pointing at victim and rifle discharged striking victim in leg. Shooter charged under C.C. for dangerous use of firearms. Had course.
15 (Injury)	(Rifle) Shooter unknown. Nov. 24, 3:00 P.M. Victim hit in knee with ricochet shot that hit a stone which came from a long distance. Could not find shooter.
16 (Injury)	(Self-inflicted) (Shotgun) Shooter 43 yrs. — 28 yrs. experience. Nov. 29, 4:30 P.M. Shooter climbing over branch, slipped and fell and gun went off striking him in the left shoulder.
17 (Injury)	(Non-Hunting) (410 Shotgun) Shooter 21 yrs. — 5 yrs. experience. Dec. 3, 8:30 A.M. Shooter and victim standing beside vehicle while on highway and shooter when unloading firearm discharged firearm. Hammer defective. Pellets struck car and ricocheted hitting victim.
18 (Injury)	(Self-inflicted) (Shotgun) Shooter 15 yrs. — 1 year experience. Hunting legally. Uncocked gun, crossed brook, recocked gun and placed butt on ground and gun discharged. Head injuries resulted. Had course.

NOTE: Accident #7 victim was wearing Hunter Orange but accident occurred before daylight when Hunter Orange was not luminous.

Appendix VII

Metric Conversion Chart

FACTORS FOR CONVERTING YARD/POUND UNITS TO METRIC (SI) UNITS

Length
feet × 0.305 = m
miles × 1.609 = km

Area
acres × 0.404 = ha

Volume or Capacity
gallons × 4.550 = litres
cords (8 ft. softwood) × 2.200 = m^3
cords (8 ft. hardwood) × 2.067 = m^3
cords (mixed inventory) × 2.209 = m^3
board feet (N.B. Log Rule) × 0.005 6 = m^3

Mass (Weight)
tons × 0.907 = t

Ratios
cords/acre × 8.956 47 = m^3 (stacked)/ha
cords/acre (8 ft. softwood) × 5.597 819 = m^3/ha
cords/acre (4 ft. softwood) × 5.947 672 = m^3/ha
cords/acre (8 ft hardwood) × 5.108 009 = m^3/ha
cords/acre (mixed inventory) × 5.457 86 = m^3/ha

FACTORS FOR CONVERTING METRIC (SI) UNITS TO CANADIAN YARD/POUND UNITS

Length
m × 3.281 = feet
km × 0.621 = miles

Area
ha × 2.471 = acres

Volume or Capacity
litres × 0.220 = gallons
m^3(2.44 m - softwood) × 0.4414 = cords
m^3(2.44 m - hardwood) × 0.4837 = cords
m^3(mixed inventory) × 0.4527 = cords
m^3 × 177 = board feet (N.B. Log Rule)

Mass (Weight)
t × 1.102 = tons

Ratios
m^3 (stacked)/ha × 0.111 651 = cords/acre
m^3/ha (2.44 m softwood) × 0.178 641 = cords/acre
m^3/ha (1.22 m softwood) × 0.168 133 = cords/acre
m^3/ha (2.44 m hardwood) × 0.195 771 = acre
m^3/ha (mixed inventory) × 0.183 222 = cords/acre

Glossary

Allowable cut	The amount of wood which may be harvested for a given period (annually or periodically), from a specified area under management.
Aquaculture	The cultivation of the natural produce of water (as fish or shellfish).
Autonomous	Having the right or power of self-government.
Conservation	See page 18 for the definition of this word as used in this report.
Conservancy	The combined effect of restoration, conservation, and improvement.
Cord	A stack of wood containing 128 cubic feet.
Cross-cut saw	Any saw with teeth specially designed for cutting across the grain.
Crosshauling	The process in which raw material for one plant passes similar material being transported to another plant or plants, with the consequence that transportation costs are not minimized.
Dynamic	Marked by continuous, usually productive, activity or change.
Environment	The conditions under which any person or thing lives or is developed; the sum total of influences which modify and determine the development of life or character.
Factor Land	A necessary component for the production of trees.
Fibre	A general term of convenience for any long narrow cell of wood.
Forest Management	The practical application of scientific, economic, and social principles to the administration of a forest property for specified objectives. In this report, management is to be understood as the combined effect of scheduling, allocation, marketing, silviculture, and protection.

Forwarder	A machine which transports trees, logs, or pulpwood off road by carrying material completely off the ground.
Habitat	The natural home or environment of a plant or animal.
Harvester	A logging machine which severs the tree from the stump, and performs one or more processing functions normally including delimbing.
Highgrading	Selective cutting, a type of exploitation cutting that removes certain species, above a certain size and of high value, with sustained yields being wholly or largely ignored or found impossible to fulfill.
Infrastructure	The underlying foundation or basic framework.
Insect vector	An organism that transmits a specific causative agent of disease.
Improvement	See page 18 for the definition of this word as used in this report.
Kraft pulp	One of the many processes whereby wood is reduced to a soft uniform mass from which a pulp product is manufactured.
Laissez-faire	A philosophy or practice characterized by a usually deliberate abstention from direction of interference especially with individual freedom of choice and action.
Monoculture	Raising crops of a single species, generally even-aged.
Monopsony	A single buyer in an area.
Newsprint	A cheap paper made chiefly from pulp and used mostly for newspapers.
Processing	Submitting a felled tree stem to a succession of conversion operations, typically at a mill but sometimes even before it is removed from its stump.
Pulpwood	Wood cut and prepared primarily for manufacture into wood pulp.
Raw material	Crude or processed material that can be converted by manufacture, processing, or combination into a new and useful product. (Pulpwood is raw material for the pulpmill.)
Reforestation	The artificial establishment of forest on a given area.
Regeneration	The process by which a forest is renewed.
Restoration	See page 18 for the definition of this word as used in this report.

Sawlog	A log considered suitable in size and quality for producing sawn timber.
Silviculture	The science and art of cultivating forest crops. More particularly, the theory and practice of controlling the establishment, composition, constitution, and growth of forests.
Stand	A community of trees, possessing sufficient uniformity as regards composition, age, spatial arrangement, or condition, to be distinguishable from adjacent communities, so forming a silvicultural or management entity.
Status quo	The existing state of things.
Sustained Yield	Implies continuous production with the aim of achieving an approximate balance between net growth and harvest.
Thinning	A felling made in a stand at any time between establishment and the initiation of a regeneration cutting or clearcutting, in which the trees removed are the same species as the trees favoured (pure or mixed stands). The purposes of thinning are: to recover volume that would normally be lost, to improve the growth and form of trees selected for the crop trees, to maintain a particular density, or to maximize financial returns over the life of the stand.
Upset Price	A predetermined minimum price, generally with reference to auction sales.
Value Added	The addition to income brought about by the use of the material or its product in the province.